AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.2.2.8

Metals as conductors

Past-paper questions

Tier	**Foundation**
Question groups	**2**
Available paper years	**2018–2022**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

5.2.2.8 Metals as conductors

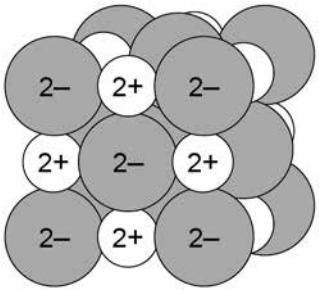
Question 01

June 2018 | 8464/C/1F | Original Q1

0 1 This question is about structure and bonding.

0 1 . 1 **Figure 1** shows part of the structure of calcium oxide (CaO).

Figure 1



What type of bonding is present in calcium oxide?

[1 mark]

Tick **one** box.

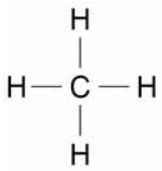
- Covalent ☐
- Ionic ☐
- Macromolecular ☐
- Metallic ☐

5.2.2.8 Metals as conductors

Question 01 · continued

0 1 . 2 **Figure 2** shows a particle of methane (CH_4).

Figure 2



What type of particle is present in **Figure 2**?

[1 mark]

Tick **one** box.

An ion ☐

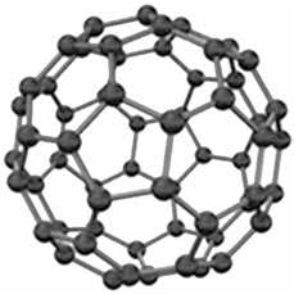
A lattice ☐

A molecule ☐

A polymer ☐

0 1 . 3 **Figure 3** shows the structure of C_{60}

Figure 3



Complete the sentence.

Choose the answer from the box.

[1 mark]

diatomic	**giant ionic**	**a fullerene**	**giant metallic**

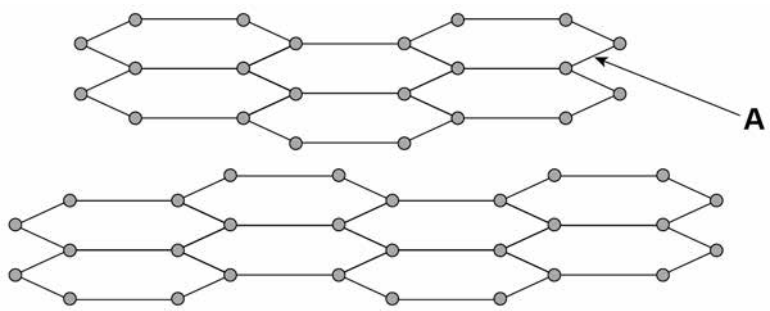
The structure of C_{60} is _____ .

5.2.2.8 Metals as conductors

Question 01 · continued

Figure 4 shows the structure of graphite.

Figure 4



0 1 . 4 What type of bond is labelled **A** in **Figure 4**?

[1 mark]

Tick **one** box.

covalent ☐

double ☐

ionic ☐

metallic ☐

0 1 . 5 In graphite, each carbon atom forms bonds with other carbon atoms as shown in **Figure 4**

How many electrons does **one** carbon atom use to form **one** bond?

[1 mark]

Tick **one** box.

1 ☐ **2** ☐ **3** ☐ **4** ☐

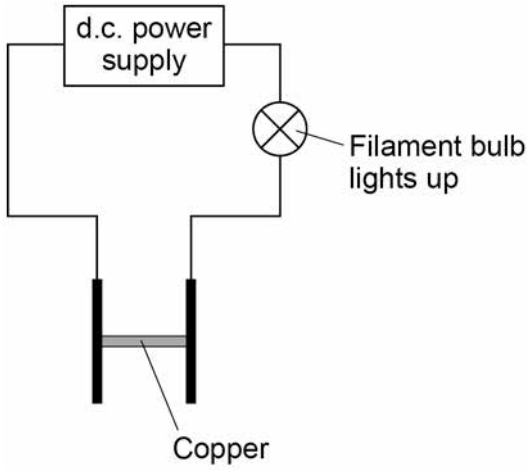
5.2.2.8 Metals as conductors

Question 01 · continued

An electric current is passed through copper.

Figure 5 shows the apparatus used.

Figure 5



0 1 . 6 Complete the sentence.

Choose the answer from the box.

[1 mark]

gas	**liquid**	**solid**	**solution**

Figure 5 shows that copper conducts electricity as a _____ .

0 1 . 7 Complete the sentence.

Choose the answer from the box.

[1 mark]

atoms	**electrons**	**ions**	**molecules**

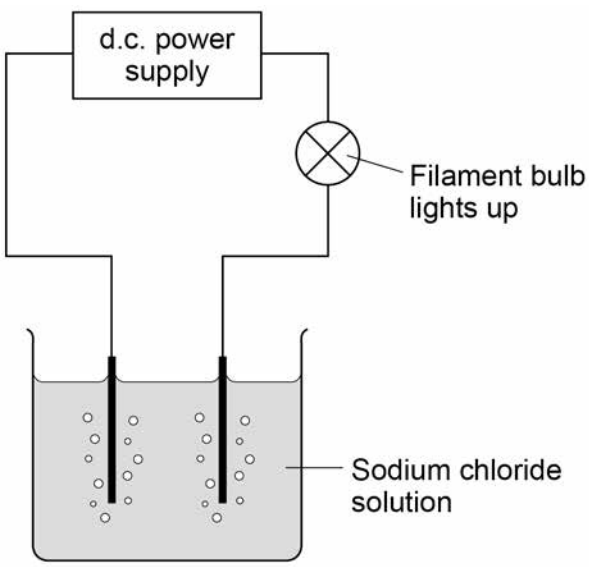
Copper conducts electricity because of the movement of delocalised _____ .

5.2.2.8 Metals as conductors

Question 01 · continued

0 1 . 8 **Figure 6** shows the apparatus used to investigate the effect of electricity on sodium chloride solution.

Figure 6



Complete the sentence.

Choose the answer from the box.

[1 mark]

dissolved	**gaseous**	**molten**

Figure 6 shows that sodium chloride conducts electricity when _____ .

5.2.2.8 Metals as conductors

Question 01 · continued

0 1 . 9 Sodium chloride is made up of ions.

Figure 7 shows the apparatus used to investigate the effect of electricity on solid sodium chloride and molten sodium chloride.

Figure 7

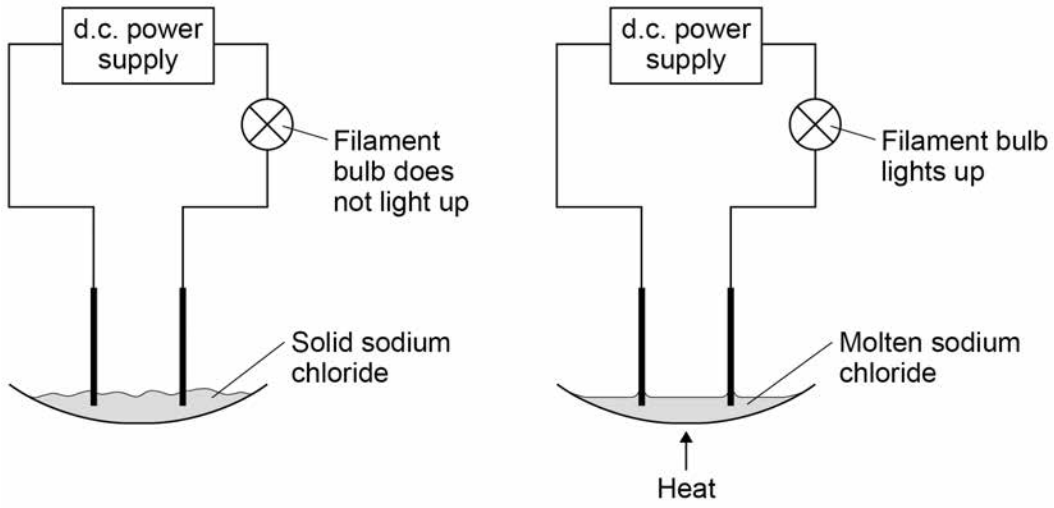


Table 1 shows the results.

Table 1

	Solid sodium chloride	Molten sodium chloride
Observation	The filament bulb does not light up	The filament bulb lights up
Deduction	Does not conduct electricity	Does conduct electricity

Draw **one** line from each statement to the correct reason.

[2 marks]

Statement	Reason
Solid sodium chloride does not conduct electricity.	The ions are fixed.
	The ions are mobile.
Molten sodium chloride conducts electricity.	The ions are neutral.
	The ions are vibrating.

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5.2.2.8 Metals as conductors

Question 02

June 2022 | 8464/C/1F | Original Q4

0 4 This question is about elements and compounds.

0 4 . 1 Magnesium and oxygen react to produce magnesium oxide.

Balance the equation for the reaction.

[1 mark]

$$_____ Mg + O_2 \rightarrow 2\,MgO$$

0 4 . 2 Suggest **one** safety precaution that should be taken when heating magnesium and oxygen.

[1 mark]

0 4 . 3 Calculate the relative formula mass (M_r) of magnesium fluoride (MgF_2).

Relative atomic masses (A_r): F = 19 Mg = 24

[2 marks]

Relative formula mass (M_r) = _____

0 4 . 4 Argon is a noble gas.

Explain why **no** product is formed when magnesium and argon are heated together.

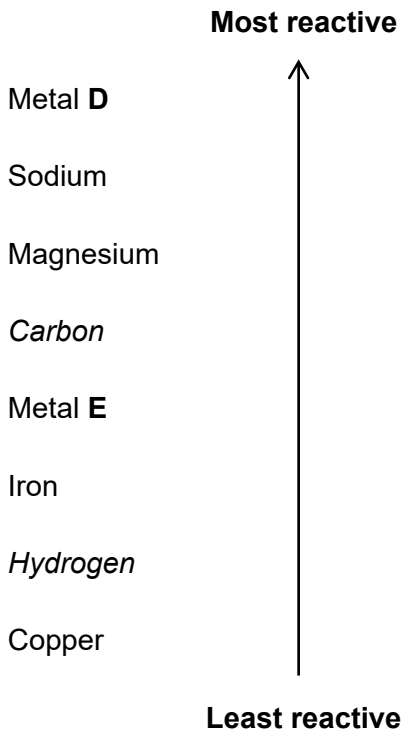
[2 marks]

5.2.2.8 Metals as conductors

Question 02 · continued

0 4 . 5 **Figure 10** shows a reactivity series.

Figure 10



5.2.2.8 Metals as conductors

Question 02 · continued

Draw **one** line from each metal to the method used to extract that metal.

Use **Figure 10**.

[2 marks]

Metal	Method used to extract that metal
	Extracted by electrolysis of a molten ionic compound.
Metal **D**	Extracted from its oxide by reduction with carbon.
	Extracted from its oxide by reduction with hydrogen.
Metal **E**	
	Removed from the Earth as the metal itself.

Question 4 continues on the next page

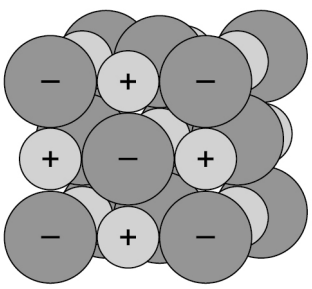
5.2.2.8 Metals as conductors

Question 02 · continued

A substance conducts electricity when it has charged particles that are free to move.

0 4 . 6 **Figure 11** represents the structure of sodium chloride.

Figure 11



Sodium chloride

Explain why sodium chloride conducts electricity when molten but **not** when solid.

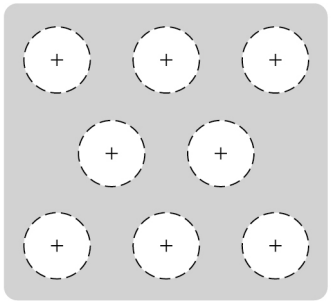
[3 marks]

5.2.2.8 Metals as conductors

Question 02 · continued

0 4 . 7 **Figure 12** represents the structure of sodium metal.

Figure 12



Sodium metal

Explain why sodium metal conducts electricity when solid.

[2 marks]

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