AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.2.2.8

Metals as conductors

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**9**
Available paper years	**2007–2023**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.2.2.8 Metals as conductors

Answer 01 · Mark scheme June 2007 | CHY1A | Original Q4 | Legacy

Four	**A**	Aluminium	**2**
	B	Iron	**3**
	C	Mercury	**1**
	D	Potassium	**4**

Answer 02 · Mark scheme June 2008 | CHY1AP | Original Q4 | Legacy

Four	**A**	a good conductor of electricity	**3**
	B	easy to bend when hot	**1**
	C	resistant to corrosion	**2**
	D	very easily worn away	**4**

Answer 03 · Mark scheme June 2009 | CHY1AP | Original Q9 | Legacy

Nine	**3**	**3**	**4**	**1**

Answer 04 · Mark scheme June 2011 | CHY1AP | Original Q8 | Legacy

Eight	**3**	**2**	**4**	**1**

Answer 05 · Mark scheme June 2017 | CH2FP | Original Q6 | Legacy

The full source mark scheme begins on page 12. Follow original question 6 in that document.

4.2.2.8 Metals as conductors

Answer 06 · Mark scheme

November 2020 | 8462/1F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	**Property** → **Reason** Conducts electricity → Aluminium has delocalised electrons Conducts electricity → Aluminium has layers of atoms which can slide High melting point → Aluminium has strong metallic bonds High melting point → Aluminium has weak intermolecular forces Aluminium has a random arrangement of atoms additional line from a box on the left negates the mark from that box		1 1	AO1 4.2.1.5 4.2.2.7 4.2.2.8
05.2	a mixture of metals	allow a mixture of a metal with other elements	1	AO1 4.2.2.7
05.3	bauxite contains a variable percentage of aluminium	allow converse argument allow bauxite does not have a fixed proportion / percentage of aluminium	1	AO3 4.1.1.1
05.4	any **two** from: • danger of dam bursting • leakage of toxic substances from mud to environment • water pollution • damage to habitats • visual pollution • (dam) blocks light • reduces the value of houses	allow the lake (of mud) could overflow allow unpleasant smell	2	AO3 4.4.3.3

Question 5 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	10 / ten		1	AO2 4.1.1.1
05.6	to lower the melting point of the mixture		1	AO1 4.4.3.3
05.7	oxygen carbon	must be in this order	1 1	AO1 4.4.3.3
05.8	$\frac{25}{100}$ × 300 000 =75 000 (kg) = 7.5 ×10^4 (kg)	 allow correct conversion to standard form of an incorrectly calculated mass	1 1 1	AO2 4.4.3.3
Total			**13**	

4.2.2.8 Metals as conductors

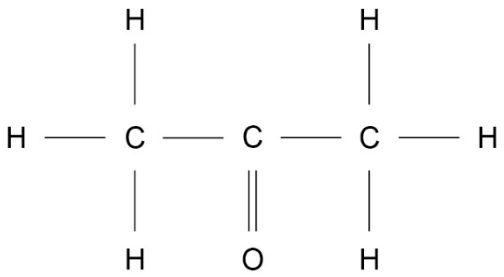
Answer 07 · Mark scheme

November 2021 | 8462/1F | Original Q8

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	spherical	allow ball-shaped ignore round / circular	1	AO1 4.2.3.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.2	any **one** from: • drug delivery (round the body) • hydrogen storage • anti-oxidants • reduction of bacterial growth • catalysts • (cylindrical fullerenes for) strengthening materials • (spherical fullerenes for) lubricants		1	AO1 4.2.3.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.3			1	AO2 4.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.4	C_3H_6O	allow CH_3COCH_3 allow elements in any order	1	AO2 4.2.1.4

Question 8 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.5	the intermolecular forces are weak		1	AO1 4.2.2.1 4.2.2.4

Question	Answers	Mark	AO/ Spec. Ref
08.6	**Level 3**: Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO1 4.2.2.6 4.2.3.2
	Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	
	No relevant content	0	
	Indicative content • bonds are covalent • giant / macromolecular structure • three (covalent) bonds per carbon atom **or** only three electrons per carbon atom used in (covalent) bonds • so one electron per carbon atom (is delocalised) • these delocalised electrons • can move through the structure • carrying (electrical) charge • so graphite conducts electricity • layered structure • of (interlocking) hexagonal rings • with weak (intermolecular) forces between layers **or** no (covalent) bonds between layers • so the layers can slide over each other • so graphite is soft and slippery		

Total			11

4.2.2.8 Metals as conductors

Answer 08 · Mark scheme

June 2022 | 8462/1F | Original Q9

Question 9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	D		1	AO3 4.1.2.3

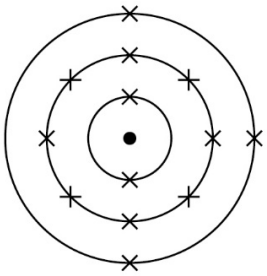
Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.2	B		1	AO3 4.1.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.3	any **two** from: (Group 1 elements) • have lower melting / boiling points • have lower densities • are less strong • are softer	allow converse statements for transition elements allow (Group 1 elements are) more malleable / ductile allow (Group 1 elements) are not useful as catalysts ignore transition elements form coloured compounds ignore transition elements form ions with different charges ignore references to chemical properties	2	AO1 4.1.3.1 4.1.3.2

4.2.2.8 Metals as conductors

Answer 08 · Mark scheme

June 2022 | 8462/1F | Original Q9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.4		allow any combination of x, •, o, $e^{(-)}$ for electrons	1	AO2 4.1.1.7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.5	delocalised electrons (the electrons) carry (electrical) charge (the electrons move) through the metal / aluminium / structure	allow free electrons ignore current / electricity for charge ignore throughout for through	1 1 1	AO1 4.2.1.5 4.2.2.8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.6	ionic		1	AO1 4.2.1.1

4.2.2.8 Metals as conductors

Answer 08 · Mark scheme

June 2022 | 8462/1F | Original Q9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.7	magnesium (atom) loses electrons		1	AO2 4.2.1.1 4.2.1.2
	oxygen (atom) gains electrons		1	
	two electrons (are transferred)		1	
	magnesium ions **and** oxide ions are formed	allow Mg^{2+} (ions) **and** O^{2-} (ions) are formed allow magnesium forms positive ions and oxygen forms negative ions allow (both) form a complete outer shell	1	

Total Question 9		**13**

4.2.2.8 Metals as conductors

Answer 09 · Mark scheme

June 2023 | 8462/1F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	any one from: • unreactive • appearance • easily shaped	 allow does not react with air / water / skin allow does not tarnish allow aesthetic reasons allow malleable allow easily moulded ignore references to cost ignore references to hardness / strength ignore references to melting / boiling point	1	AO3 4.4.1.2 4.4.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	any **two** from: • bubbles • moves • floats • melts • disappears	 allow forms a ball allow catches fire	2	AO1 4.1.2.5 4.4.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	copper is harder copper is less reactive		1 1	AO1 4.1.3.1

4.2.2.8 Metals as conductors

Answer 09 · Mark scheme

June 2023 | 8462/1F | Original Q6

Question	Answers	Mark	AO/ Spec. Ref
06.4	**Level 2:** Some logically linked reasons are given. There may also be a simple judgement.	3–4	AO3 4.2.2.7 4.2.2.8
	Level 1: Relevant points are made. They are not logically linked.	1–2	
	No relevant content	0	
	Indicative content • copper is the better conductor • so heats food more quickly • copper has the higher density • so the pan is heavier • copper costs more per kilogram • so the pan is more expensive to buy • simple judgement		

Total Question 6	**9**

4.2.2.8 Metals as conductors

GCSE

Additional Science / Chemistry

CH2FP
Final Mark scheme

4408 / 4402
June 2017

Version/Stage: v1.0

4.2.2.8 Metals as conductors

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

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Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.
At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.
In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**.
Different terms in the mark scheme are shown by a / ; eg allow smooth/free movement.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

[1 mark]

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system.

[2 marks]

Student	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols/formulae

If a student writes a chemical symbol/formula instead of a required chemical name, full credit can be given if the symbol/formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution/working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.
Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation 'ecf' in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Accept/allow

Accept is used to indicate an equivalent answer to that given on the left-hand side of the mark scheme. Allow is used to denote lower-level responses that just gain credit.

3.9 Ignore/Insufficient/Do not allow

Ignore or insufficient is used when the information given is irrelevant to the question or not enough to gain a marking point. Any further correct amplification could gain the marking point.
Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

4 Quality of Written Communication and levels marking

In Question 6 students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:
- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: Basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail.
- The spelling, punctuation and grammar are very weak.

Level 2: Clear

- Knowledge of accurate information.
- Clear understanding.
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given.
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: Detailed

- Knowledge of accurate information appropriately contextualised.
- Detailed understanding, supported by relevant evidence and examples.
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

4.2.2.8 Metals as conductors

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1 (a)(i)	the ink would run / smudge / smear	accept converse	1	**AO1** 2.3.2b
1 (a)(ii)	below		1	**AO1** 2.3.2b
1 (a)(iii)	any **two** from: • contains red • does not contain blue • contains two other colours • contains three colours in total	do **not** accept contains red and blue	2	**AO3** 2.3.2b
1(b)(i)	separated		1	**AO1** 2.3.2c
1(b)(ii)	6/six		1	**AO2** 2.3.2c
1(b)(iii)	any **one** from: • accurate • sensitive • rapid / fast • small sample.	do **not** accept more precise do **not** accept more reliable	1	**AO1** 2.3.2a
Total			**7**	

4.2.2.8 Metals as conductors

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	s		1	**AO2** 2.6.1a
2(a)(ii)	to speed up the reaction		1	**AO2** 2.6.1b
2(a)(iii)	tick (✓) by: 1		1	**AO1** 2.6.2d
2(a)(iv)	tick (✓) by: To make sure all the sulfuric acid has reacted		1	**AO1** 2.6.1b
2(b)(i)	funnel	accept filter funnel	1	**AO1** 2.6.1b
2(b)(ii)	heat / evaporate / boil	accept cool accept leave (to evaporate) do **not** accept heat until all water gone	1	**AO1** 2.6.1b
2(c)	tick (✓) by: The student left some copper sulfate crystals in the apparatus.		1	**AO3** 2.3.3d
2(d)(i)	white	accept grey	1	**AO1** 2.5.1d
2(d)(ii)	it goes blue	accept steam / water vapour ignore unspecified colour change	1	**AO1** 2.5.1d
2(e)(i)	polymers		1	**AO1** 2.2.5a
2(e)(ii)	as wealth decreases, ethene production decreases	accept converse	1	**AO2** 2.6; 3.7.12
2(e)(iii)	no relationship		1	**AO2** 2.6; 3.7.12
Total			**12**	

4.2.2.8 Metals as conductors

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)(i)	tick (✓) by: covalent		 1	**AO1** 2.1.1g
3(a)(ii)	ticks (✓) by: oxygen consists of small molecules oxygen has a low boiling point		 1 1	**AO1** 2.1.1g
3(b)(i)	magnesium (atom) loses (electrons) oxygen (atom) gains (electrons) two (electrons) ions formed	max 3 if reference to incorrect particle or incorrect bonding accept ionic bonding or full outer shells/noble gas structure is formed allow magnesium forms positive (ion) **or** oxygen forms negative (ion)	 1 1 1 1	**AO1** **AO2** 2.1.1a,b,c, d,e,f
3(b)(ii)	ticks (✓) by: nanoparticles contain a few hundred atoms nanoparticles have a high surface area to volume ratio		 1 1	**AO1** 2.2.6a
3(c)	giant covalent		1	**AO1** 2.2.3a
Total			**10**	

4.2.2.8 Metals as conductors

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)	58.5		1	**AO2** 2.5.1b
4(b)	water		1	**AO2** 2.3.3a
4(c)(i)	prevents loss of thermal energy	allow prevents heat loss	1	**AO1** 2.6.1
4(c)(ii)	13/thirteen		1	**AO3** 2.5.1
4(c)(iii)	temperature changes/results are all similar	accept no anomalous results allow they are all similar do **not** accept temperature	1	**AO2** 2.5.1
4(c)(iv)	exothermic	allow giving out energy	1	**AO3** 2.5.1
4(d)(i)	ions move	allow they move ignore free ions do not accept movement of electrons	1	**AO1** 2.7.1a 2.2.2b
4(d)(ii)	(chloride ions are) negative	accept opposites attract do **not** accept chlorine is negative	1	**AO1** 2.7.1c
4(d)(iii)	Tick (✓) by: soap		1	**AO1** 2.7.1i
4(d)(iv)	1 bonding pair of electrons 6 unbonded electrons on Cl	accept dot, cross, e or – or any combination	1 1	**AO2** 2.1

4.2.2.8 Metals as conductors

4(d)(v)	Tick (✓) by: $\frac{1}{36.5}$ x 100		1	**AO2** 2.3.3a
Total			**12**	

4.2.2.8 Metals as conductors

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	a smooth curve through or close to all points except (30,12)		1	**AO2** 2.4
5(a)(ii)	correct reading from the curve in 1(a)(i) (cm^3)	allow a tolerance of +/- 0.5 cm^3	1	**AO2** 2.4
5(a)(iii)	45-50 (seconds)		1	**AO3** 2.4
5(a)(iv)	line becomes less steep because gas is produced more slowly	ignore line levels out or plateaus allow examples with figures, eg 12 cm^3 gas from 0 to 20s but 1.5 cm^3 gas in last 20s ignore reaction has stopped or no more gas produced	1 1	**AO3** 2.4
5(a)(v)	0.6 (cm^3 per second)	allow 0.55 to 0.65	1	**AO2** 2.4
5(b)(i)	 temperature volume (of hydrogen peroxide)	concentration of hydrogen peroxide = max **1** ignore amount (of hydrogen peroxide)	 1 1	**AO3** 2.4
5(b)(ii)	 rate increases because more particles (in the same volume) so frequency of collisions increases	incorrect reference to energy = max **2** accept particles closer together allow greater chance of collisions ignore more collisions	 1 1 1	**AO1** 2.4.1e

4.2.2.8 Metals as conductors

5(c)	(increasing the amount of catalyst) increases rate same final volume of gas	accept steeper graph or graph levels off earlier	1 1	**AO2** 2.4.1g
Total			**13**	

4.2.2.8 Metals as conductors

<table>
<tr><th>Question</th><th>Answers</th><th>Extra information</th><th>Mark</th><th>AO / Spec. Ref.</th></tr>
<tr><td>6</td><td></td><td></td><td>6</td><td rowspan="6">AO1
2.1.1h
2.2.4b,c
2.2.5a,b</td></tr>
<tr><td colspan="4">Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a ‘best-fit’ approach to the marking.</td></tr>
<tr><td>0 marks</td><td>Level 1 (1–2 marks)</td><td>Level 2 (3–4 marks)</td><td>Level 3 (5–6 marks)</td></tr>
<tr><td>no relevant information given</td><td>a statement about the structure or a property of a metal
or
a statement about the structure or a property of a polymer</td><td>a statement about the structure or a property of a metal
and
a statement about the structure or a property of a polymer</td><td>a statement about the structure or a property of a metal
and
a statement about the structure or a property of a polymer
and
at least one statement linking structure and property</td></tr>
<tr><td colspan="4">Statements shown as HT only are credited on both FT and HT.
However, HT only means that these statements are not expected in a FT answer.</td></tr>
<tr><td colspan="4">Examples of chemistry points made in response
Metal:
Properties
shiny
hardness
(tensile) strength
melting point/boiling point
density
malleable/flexible
ductile
conduct electricity or thermal energy</td></tr>
</table>

4.2.2.8 Metals as conductors

Structure • metals contain atoms /((positive) ions HT only) • (the atoms/(positive) ions/particles are) closely packed / in a regular pattern / in a giant structure/in layers / in a lattice • strong bonds/(electrostatic attractions HT only) • (metal has delocalised electrons HT only) **Polymer:** **Properties** • flexible • melting/boiling point • density • can be shaped/moulded • poor conductor of electricity or thermal energy **Structure** • polymer consists of chains • polymer chains may be tangled • polymer has no cross links. • (polymer has weak intermolecular forces HT only) **Level 3:** **Examples of linked statements:** • metal can be bent and shaped because the layers can slide • some metals are soft because layers can slide • some metals are hard because they have strong bonds and/ or (the atoms/(positive) ions/particles) are closely packed / in a regular pattern / in a giant structure / in a lattice • metal has high melting/boiling point because they have strong bonds and/ or (the atoms/(positive) ions/particles) are closely packed / in a regular pattern / in a giant structure / in a lattice • metal is strong because of strong bonds • some metals are dense because the atoms are closely packed • (metal can conduct thermal energy and electricity because metal has delocalised electrons HT only) • thermosoftening polymer melts when heated because it has no cross-links (or has weak intermolecular forces HT only) • thermosoftening polymer is flexible because the chains can move over each other	

Total			**6**

4.2.2.8 Metals as conductors

Answer 08 · Examiner comments — June 2022 | 8462/1F | Original Q9

Question 9 (Standard demand)

09.1 Fewer than a quarter of students recognised that element **Q** must be a non-metal because of the lack of conductivity, and therefore in section **D**. **B** and **C** were both seen more often than the correct answer, though responses were fairly evenly spread across all options.

09.2 This was slightly better answered than the previous question. However, again responses were spread across all options.

09.3 Most students described a property of either a Group 1 element or a transition element without reference to the other; this did not gain credit as a comparison was needed. Of those students who did answer in comparative terms, most knew that Group 1 metals are softer than transition metals, but there was confusion about which had lower melting points. Some students thought that one group or the other would not conduct electricity. Very few students were awarded both marks; about a sixth scored one mark.

09.4 Most students could draw the electronic structure correctly. The most common error was to draw only one electron on the outer shell.

09.5 Most students referred to electrons in their answer as required, but fewer than a third described those electrons as delocalised. Some also referred to the electrons carrying charge. However, very few articulated the idea that the electrons themselves move through the metal in a particular direction. Of those who referred to electrons moving, many implied that the movement was random. Some students incorrectly referred to electrons bumping into other atoms or electrons.

Answer 08 · Examiner comments — June 2022 | 8462/1F | Original Q9

09.6 Just over half of students correctly identified the type of bonding. The most common incorrect response was covalent.

09.7 Many students gave good descriptions of the transfer of two electrons from a magnesium atom to an oxygen atom to produce magnesium ions and oxide ions. However, some students subsequently referred to electrons being shared. About 40% of students were awarded at least one mark, with about a sixth gaining all four marks.

4.2.2.8 Metals as conductors

Answer 09 · Examiner comments

June 2023 | 8462/1F | Original Q6

Question 6 (low and standard demand)

06.1 Only a third of students gave a property of platinum which was relevant in its use for jewellery. Many gave properties which are not relevant, such as high density, high melting point or high strength.

06.2 The great majority scored at least one mark. Students were asked for observations which could be seen, so those which could be heard did not gain credit. Bubbling and fizzing are the same observation; many gave both terms and no other observation so scored only one mark. Some incorrectly said that the water changes colour (possibly because they have seen the reaction carried out in the presence of an indicator).

06.3 Most students scored at least one mark, with the vast majority knowing that copper is less reactive than sodium. The differences in physical properties were less well known, with many thinking that copper has a lower melting point.

06.4 Three quarters of students could compare the three properties and therefore achieve a mark in level 1. However, far fewer reached level 2, where there needed to be links to these properties, such as a copper pan cooking food more quickly because of copper's higher thermal conductivity. Many students incorrectly linked density to strength or longevity of the pan. Some students referred incorrectly to electrical conductivity: a property which is not relevant here and for which no data were provided. Many students also provided a simple judgement as to which pan is better overall. Many students simply quoted the values in the table, but did not add any value to the data.