

# Chemical Bonds; Ionic; Covalent; Metal

## Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.2 Bonding Structure + Props Matter
Sub-Topic	Chemical Bonds; Ionic; Covalent; Metal
Difficulty Level	Bronze Level
Booklet	Mark Scheme 1

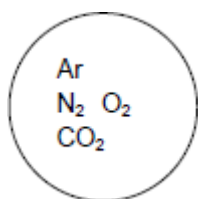
Time Allowed: 55 minutes

Score: /54

Percentage: /100

Grade Boundaries:

<b>M1.(a)</b>	Carbon and silicon	1
	(b) Atomic number	1
	(c) Hydrogen / fluorine / chlorine are not in Group 1 of the periodic table <b>or</b> Hydrogen and fluorine / chlorine are not in the same group of the periodic table	1
	Lithium / sodium / potassium are in Group 1 of the periodic table	1
	(d) plum pudding model has a single ball of positive charge and nuclear model has positive charges in the centre / nucleus	1
	plum pudding model has electrons in random positions and nuclear model has electrons in fixed positions	1
	plum pudding model has no nucleus and the nuclear model has a nucleus	1
	plum pudding model has no neutrons and the nuclear model has neutrons in the nucleus	1
	(e)	



1

(f) Covalent bond

1

[10]

**M2.(a)** (i) C

1

(ii) B

1

(iii) A

1

(iv) D

1

(b) (i) SO<sub>2</sub>

1

(ii) shared

1

(iii) covalent

1

[7]

**M3.(a)** any **one** from:

- protection / improve lifespan
- improve appearance.

1

(b) (i) Bleach

		1
(ii)	Hydrogen is less reactive than sodium	1
(iii)	1 bonding pair of electrons 6 unbonded electrons on Cl <i>accept dot, cross or e or – or any combination</i>	1
(iv)	Covalent	1
(v)	Hydrogen chloride has a low boiling point.	1
	Hydrogen chloride is made of simple molecules.	1
(c)	(i) oxygen <i>accept carbon dioxide</i>	1
	(ii) aluminium ions are positive  so are attracted (to the negative electrode) <i>allow opposites attract</i>	1
	(iii) Reduction	1
	(iv) slide <i>allow move</i>	1
(d)	(i) C	1
	(ii) strong covalent bonds	1
		[14]
M4.(a)	(i) two	1

- (ii) a molecule 1
- (iii) one pair of electrons between nitrogen and each of 3 hydrogens 1
- rest correct  
second mark dependent on first 1
- (b) (i) (g) (s) 1
- (ii) chloride  
ignore formulae 1
- (c) (i) any **one** from: 1
- wear goggles
  - wear gloves
  - do not breathe in fumes
  - wipe up spills immediately
  - work in a fume cupboard
- (ii) (particles of) ammonia move faster than (particles of) hydrogen chloride  
allow diffuses faster  
allow hydrochloric acid 1
- (iii) particles / molecules have more energy  
do **not** accept atoms / ions 1

so they move faster  
*ignore references to rate of reaction*

1  
[10]

**M5.(a)** four

1

covalent

1

(b) because it has a high melting point  
*accept it won't melt*  
*accept it won't decompose or react*  
*allow withstand high temperatures*  
*ignore boiling point*

1

(c) thin

1  
[4]

**M6.(a)** exothermic

1

(b) 'Should people use kelp instead of oil as an energy source?'

1

'Will kelp be more popular than coal in the next 10 years?'

1

(c) (i) any **four** from:

*If atom or ion omitted = max 3*

*sharing / covalent / metallic*

*= max 3*

*ignore reference to full outer shells*

- potassium (atom) loses (an electron) and iodine (atom) gains (an electron)
- 1 electron
- iodide (ion) has negative charge  
*allow iodine ion*
- potassium (ion) has positive charge
- electrostatic attraction **or** ionic bonding  
*accept stable (structure) or noble gas (structure)*

4

(ii) because a solid is formed (from two aqueous solutions)

1

(iii) filtering **or** centrifuging **or** decanting

1

[9]