

# Identification of Common Gases

## Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.8 Chemical Analysis
Sub-Topic	Identification of Common Gases
Difficulty Level	Standard Level
Booklet	Mark Scheme 1

Time Allowed: 38 minutes

Score: /38

Percentage: /100

Grade Boundaries:

<b>M1.(a)</b>	Safe to drink	1
	(b) To remove undissolved solids	1
	(c) the gas is chlorine / $\text{Cl}_2$	1
	which sterilises water	1
	(d) as distance between steel increases strength of concrete decreases	1
	change above and change below 1.0 cm separation is compared and described <i>must refer to graph values for this mark</i>	1
		[6]
<b>M2.(a)</b>	(i) copper is less reactive than hydrogen <b>or</b> copper is unreactive	1
	(ii) Zinc and dilute hydrochloric acid	1
	(b) (gas) syringe	1

(c) (i) 35

*allow 3*

1

because not close to others

*accept it is much lower than the others*

*ignore references to trends or patterns*

*dependent on the first mark*

1

(ii)  $(49 + 50 + 48) / 3$

$= 49$

*correct answer with or without working gains 2 marks*

1

*allow ecf from anomaly identified in (i) for 2 marks:*

- *Exp 1 anomalous gives 43.3*
- *Exp. 2 anomalous gives 44*
- *Exp. 4 anomalous gives 44.7*

*answer of 45.5 or 46 (anomaly not excluded) gains 1 mark*

*correct working **excluding anomaly** but with wrong answer gains 1 mark*

1

(iii) so that a mean can be calculated

*accept improves accuracy of the mean **or** so anomalies can be identified / discarded **or** to reduce effect of random errors*

*ignore makes it a fair test*

*ignore reliability, validity, repeatability, reproducibility*

1

(d) (i) idea of mixing with oxygen / air, letting air / oxygen in

*accept converse*

1

(ii)  $\text{H}_2\text{O}$

*do not accept incorrect additional products*

1

balancing 2 ... (1) ... 2  
*allow fractions or multiples*  
*dependent on first mark*

1  
[11]

**M3.(a)** time from when the heating is started until

1

the limewater turns cloudy / milky

1

(b) (i) the temperature was not high enough  
*accept the copper carbonate had not started to decompose /*  
*react*  
*accept it takes time to heat up the copper carbonate*

1

the bubbles of gas were air  
*accept no carbon dioxide produced*

1

(ii) the copper carbonate was decomposing / reacting  
*accept the temperature was high enough to cause*  
*decomposition / a reaction*

1

so carbon dioxide was produced  
*allow correct word / symbol equation*

1

(iii) copper oxide was produced  
*allow correct word / symbol equation*

1

because the copper carbonate had completely decomposed / reacted  
*ignore all of the carbon dioxide had been given off*

1

[8]

**M4.(a)** (i) any **two** from:

- bubbles / effervescence / fizzing  
*ignore hydrogen / gas produced*
- lithium disappears / gets smaller  
*allow dissolves*  
*do **not** allow melts / burns*
- lithium moves on the surface of the water  
*ignore floats*
- (universal indicator) turns blue / purple

2

(ii) 2

*left-hand side correct*

1

2

*right-hand side correct*  
*allow multiples for full credit*

1

(iii) light / burn, which will give a (squeaky) pop / explosion

1

(iv) all have 1 electron in their outer shell / energy level

*allow have the same number of electrons in their outer shell /  
energy level*

1

(b) They react with oxygen

1

They have low melting points

1

- (c) (i) electronic structure [2,8,8] is drawn  
*incomplete inner shells scores a maximum of 1 mark*

1

charge is +  
*allow [2,8,8]<sup>+</sup> for 1 mark*

1

- (ii) because (in potassium) the outer shell electron is further away from the nucleus **or** because potassium atoms are larger than sodium atoms  
*it should be clear that the candidate is referring to the outer shell electron: if this is not clear a maximum of 2 marks can be awarded*

1

therefore the outer shell electron is less strongly attracted to the nucleus **or** is more shielded from the attraction of the nucleus and so the outer shell electron in potassium is more easily lost

1

*3 marks can be scored for answering the question in terms of sodium*

1

[13]