AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.8.3.2

Metal hydroxides

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**17**
Available paper years	**2007–2025**

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.

4.8.3.2 Metal hydroxides

Answer 01 · Mark scheme

November 2007 | CHY1A | Original Q1 | Legacy

One	**A**	atoms	**1**
	B	compounds	**3**
	C	elements	**4**
	D	molecules	**2**

4.8.3.2 Metal hydroxides

Answer 02 · Mark scheme

Question 4

question	answers	extra information	mark
(a)(i)	ionic		1
(a)(ii)	elements		1
(b)(i)	chlorine (gas)	allow Cl_2 / Cl / Cl^2 allow chloride	1
(b)(ii)	hydrogen (gas)	allow H / H_2 / H^2	1
(b)(iii)	sodium hydroxide (solution)	allow NaOH allow sodium solution	1
total			5

4.8.3.2 Metal hydroxides

Answer 02 · Mark scheme

January 2008 | CHY2F | Original Q4 | Legacy

CHY2F

4.8.3.2 Metal hydroxides

Answer 03 · Mark scheme January 2008 | CHY3F | Original Q3 | Legacy

Question 3

question	answers	extra information	mark
(a)(i)	burette		1
(a)(ii)	conical flask	accept conical / flask	1
(b)(i)	an indicator		1
(b)(ii)	changed colour		1
(b)(iii)	titration		1
(c)	3	correct answer = **2** marks (1 × 3) or (1 × 750/250) = **1** mark	2
(d)(i)	hydrogen		1
(d)(ii)	is partially ionised		1
total			9

4.8.3.2 Metal hydroxides

Answer 03 · Mark scheme

January 2008 | CHY3F | Original Q3 | Legacy

CHY3F

4.8.3.2 Metal hydroxides

Answer 04 · Mark scheme

June 2009 | CHY2F | Original Q8 | Legacy

Question 8

question	answers	extra information	mark
8(a)	hydrogen / H^+ /$2H^+$ / H_3O^+	allow H / 2H do **not** accept H_2 apply list principle	1
8(b)(i)	143	correct answer with or without working = **2** marks ignore units if answer is not correct 40 + (2 × 35.5) + (2 × 16) gains **1** mark	2
8(b)(ii)	49.7% (49.6 to 50)	correct answer with or without working = **2** marks answer 49 gains **1** mark if answer is not correct: (71 ÷ 143) × 100 gains **1** mark allow error carried forward from part (b)(i) ie. (71 or their (2 × 35.5) ÷ answer to (b)(i)) × 100 gains **2** marks if calculated correctly and **1** mark if not calculated correctly. **Special case** 35.5 ÷ 143 × 100 = 24.8 to 25% **or** 35.5 ÷ answer to (b)(i) x 100 correctly calculated for **1** mark	2
8(b)(iii)	9.9 to 10g	allow ecf from (b)(i) or (b)(ii)	1

Question 8 continued on next page…

4.8.3.2 Metal hydroxides

CHY2F

Question 8

question	answers	extra information	mark
8(c)(i)	an alkali	apply list principle accept named alkali accept hydroxide accept soluble base ignore base	1
8(c)(ii)	a solid / insoluble substance (owtte)		1
8(c)(iii)	filter / filtration	allow decant / centrifuge accept filtration followed by evaporation **or** filtration and evaporation do **not** accept filtration or evaporation do **not** accept evaporation and filtration	1
Total			**9**

4.8.3.2 Metal hydroxides

Answer 05 · Mark scheme January 2010 | CHY3F | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4(a)(i)	yellow		1
4(a)(ii)	lilac		1
4(a)(iii)	melting point		1
4(b)(i)	barium chloride solid		1 1
4(b)(ii)	white dissolved		1 1
Total			**7**

4.8.3.2 Metal hydroxides

Answer 05 · Mark scheme

January 2010 | CHY3F | Original Q4 | Legacy

CHY3F

4.8.3.2 Metal hydroxides

Answer 06 · Mark scheme

June 2010 | CHY3F | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4(a)(i)	sodium hydroxide green solid		1 1 1
4(a)(ii)	barium chloride white sulfate ions, SO_4^{2-}		1 1 1
4(b)	some indication of contact between (colourless) flame and the chemical	ignore colour of flame	1
4(c)	any **one** from: • accurate • precise • sensitive • reliable • rapid • only small amount needed	ignore reference to cost / safer	1
Total			**8**

4.8.3.2 Metal hydroxides

Answer 06 · Mark scheme

June 2010 | CHY3F | Original Q4 | Legacy

CHY3F

4.8.3.2 Metal hydroxides

Answer 07 · Mark scheme January 2011 | CHY3F | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)	stop them reacting	owtte	1
2(b)(i)	fizzing / bubbles / effervescence	owtte	1
2(b)(ii)	(g)		1
2(b)(iii)	limewater		1
2(c)	yellow		1
2(d)(i)	barium chloride		1
2(d)(ii)	white		1
2(d)(iii)	eg don't see what is being bought **or** a comment about quality / purity eg may be impure / contaminated	ignore references to cost	1
Total			**8**

4.8.3.2 Metal hydroxides

Answer 07 · Mark scheme

January 2011 | CHY3F | Original Q2 | Legacy

CHY3F

4.8.3.2 Metal hydroxides

Answer 08 · Mark scheme June 2013 | CH3FP | Original Q2 | Legacy

Question 2

question	Answers	extra information	Mark
2(a)(i)	yellow		1
2(a)(ii)	lilac		1
2(b)	(bubble through) limewater cloudy	 allow white / milky	1 1
2(c)(i)	silver nitrate solution		1
2(c)(ii)	white		1
Total			**6**

4.8.3.2 Metal hydroxides

Answer 09 · Mark scheme June 2014 | CH3FP | Original Q3 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
3(a)(i)	burette		1	1 / 3.4.1g	A
3(a)(ii)	indicator		1	1 / 3.4.1g	A
3(a)(iii)	colour change		1	1 / 3.4.1g	E
3(b)(i)	any **one** from: • volume of (hydrochloric) acid • concentration of (hydrochloric) acid • concentration of (sodium) hydroxide	*allow amount of (hydrochloric) acid* allow concentration of alkali	1	3 / 3.4.1g	E
3(b)(ii)	22.3(0)		1	2 / 3.4.1g	G
Total			**5**		

4.8.3.2 Metal hydroxides

Answer 09 · Mark scheme

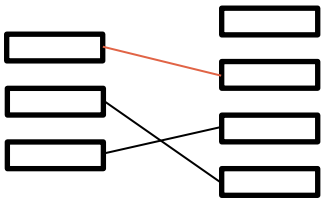
June 2014 | CH3FP | Original Q3 | Legacy



4.8.3.2 Metal hydroxides

Answer 10 · Mark scheme

June 2014 | CH3FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
6(a)(i)	*method of introducing sample into flame* *clean wire or colourless flame*	*e.g. wire/splint/spray* *allow blue / roaring flame*	1 1	1 / 3.4	E
6(a)(ii)			1 1	2 / 3.4.1a	G
6(a)(iii)	(potassium) chloride	allow KCl **or** Cl^-	1	2 / 3.4.1e	E
6(b)(i)	copper	allow Cu^{2+}	1	2 / 3.4.1c	E
6(b)(ii)	sulfate		1	2 / 3.4.1f	A
Total			**7**		

4.8.3.2 Metal hydroxides

Answer 10 · Mark scheme

June 2014 | CH3FP | Original Q6 | Legacy



4.8.3.2 Metal hydroxides

Answer 11 · Mark scheme

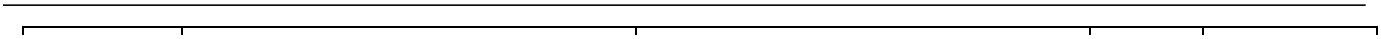
June 2015 | CH3FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	copper (II) → blue iron (III) → brown	more than one line from any box negates the mark	1 1	**AO1** 3.4.1.c
6(b)	aluminium	allow correct answer shown in box if answer line blank	1	**AO1** 3.4.1.b
6(c)(i)	yellow	allow orange	1	**AO1** 3.4.1.a
6(c)(ii)	lilac	allow purple	1	**AO1** 3.4.1.a
6(c)(iii)	one colour masks the other	allow colours mixed	1	**AO2** 3.4.1.a
Total			**6**	

4.8.3.2 Metal hydroxides

Answer 11 · Mark scheme

June 2015 | CH3FP | Original Q6 | Legacy



4.8.3.2 Metal hydroxides

Answer 12 · Mark scheme

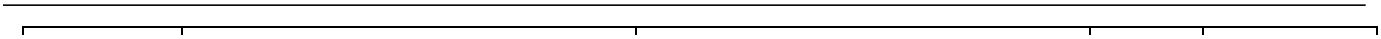
June 2015 | CH3FP | Original Q7 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)(i)	(19.5 + 18.5 + 19.0)/3	allow (23.0 +19.5 + 18.5 + 19.0)/4 for **1** mark	2	**AO2/ AO3** 3.4.1.g
7(a)(ii)	R P Q	allow Q P R for **1** mark	2	**AO3** 3.4.1.g
7(b)	any **two** from: • repeat more times • calculate a mean • measure to one decimal place		2	**AO3** 3.4.1.g
7(c)	both students get similar results / similar pattern		1	**AO3** 3.4.1.g
Total			**7**	

4.8.3.2 Metal hydroxides

Answer 12 · Mark scheme

June 2015 | CH3FP | Original Q7 | Legacy



4.8.3.2 Metal hydroxides

Answer 13 · Mark scheme

June 2019 | 8462/2F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	Filtration → Improve taste Sterilisation → Kill bacteria Desalination Increase pH Remove solids	an extra line from a step to a reason for that step negates that mark	1 1	AO1 4.10.1.2
01.2	chlorine ozone		1 1	AO1 4.10.1.2
01.3	evaporate all water from the sample measure the sample's boiling point		1 1	AO2 4.8.1.1 4.10.1.2
01.4	Aluminium ion → Copper sulfate Sulfate ion → Barium chloride Silver nitrate Sodium hydroxide Sulfuric acid	an extra line from an ion to a compound needed negates that mark	1 1	AO1 4.8.3.2 4.8.3.5
01.5	distillation		1	AO1 4.10.1.2
Total			9	

4.8.3.2 Metal hydroxides

Answer 14 · Mark scheme

November 2020 | 8462/2F | Original Q8

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	green	allow blue-green	1	AO1 4.8.3.1 RPA 7
08.2	did not clean the metal wire (between tests) **or** copper sulfate (solution) is still present (so) colours are mixed / blended / masked		1 1	AO3 4.8.3.1 RPA 7
08.3	(copper sulfate solution) blue precipitate (calcium iodide solution) white precipitate	allow blue solid allow white solid	1 1	AO1 4.8.3.2 RPA 7
08.4	barium chloride (solution)	allow barium nitrate (solution)	1	AO1 4.8.3.5 RPA 7
08.5	silver nitrate (solution) yellow precipitate	 allow yellow solid allow pale yellow precipitate / solid	1 1	AO1 4.8.3.4 RPA 7
Total			**8**	

4.8.3.2 Metal hydroxides

Answer 15 · Mark scheme

November 2021 | 8462/2F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	flame emission spectroscopy flame test		1 1	AO1 4.8.3.1 4.8.3.7 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	white		1	AO2 4.8.3.2 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	barium chloride (solution)		1	AO1 4.8.3.5 RPA7

Question 6 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	(conversion) (800 cm^3 = $\frac{800}{1000}$ =) 0.8 (dm^3) (mass =) 0.8 × 258 (g) = 206.4 (g) = 206 (g) **alternative approach:** (conversion) (258 g/dm^3 = $\frac{258}{1000}$ =) 0.258 (g/cm^3) (1) (mass =) 0.258 × 800 (g) (1) = 206.4 (g) (1) = 206 (g) (1)	 allow correct use of incorrect / no volume conversion allow an answer correctly calculated to 3 significant figures from an incorrect calculation which uses the values in the question allow correct use of incorrect / no concentration conversion allow an answer correctly calculated to 3 significant figures from an incorrect calculation which uses the values in the question	 1 1 1 1	AO2 4.3.2.5

Total			8

4.8.3.2 Metal hydroxides

Answer 16 · Mark scheme

June 2022 | 8462/2F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	100 7	must be in this order	1 1	AO1 4.8.1.1 4.10.1.2 RPA8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	pH probe / meter **or** universal indicator (paper / solution)	allow wide range indicator (paper / solution)	1	AO1 4.10.1.2 RPA8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	balance measuring cylinder		1 1	AO1 4.10.1.2 RPA8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	(mean =) $\frac{1.73 + 1.70 + 1.75 + 1.78}{4}$ = 1.74 (g)		1 1	AO2 4.10.1.2 RPA8

4.8.3.2 Metal hydroxides

Answer 16 · Mark scheme

June 2022 | 8462/2F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	(mass =) $\frac{1.5 \times 1000}{50}$ = 30 (g)		1 1	AO2 4.10.1.2 RPA8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	yellow		1	AO1 4.8.3.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	white		1	AO1 4.8.3.4 RPA7

Total Question 1		11

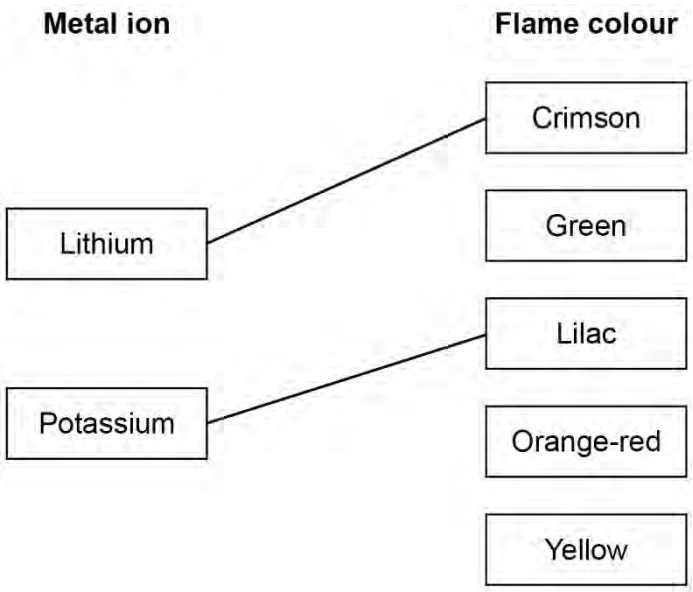
4.8.3.2 Metal hydroxides

Answer 17 · Mark scheme

June 2025 | 8462/2F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	put sample on (metal) wire hold wire in (blue / non-luminous) flame	ignore references to cleaning	1 1	AO1 4.8.3.1 RPA7

Question	Answers	Mark	AO / Spec. Ref.
01.2	 do **not** accept more than one line from a box on the left	1 1	AO1 4.8.3.1 RPA7

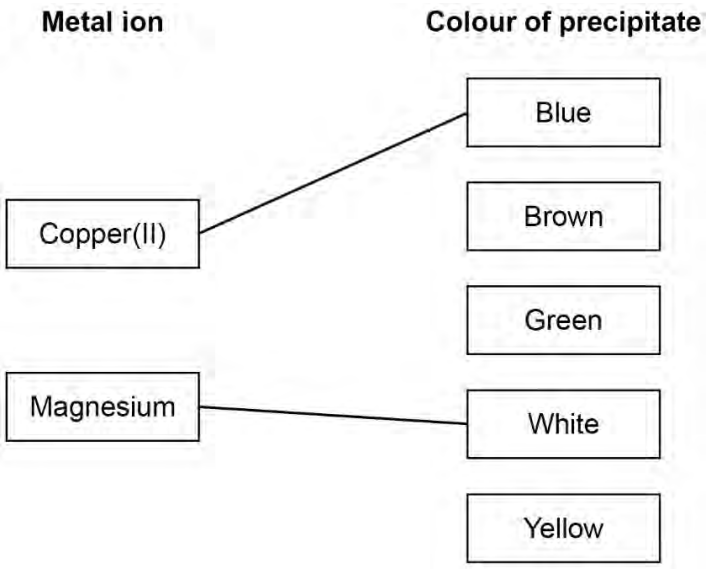
Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	carbon dioxide		1	AO1 4.8.3.3

4.8.3.2 Metal hydroxides

Answer 17 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	barium chloride solution		1	AO1 4.8.3.5 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	solid		1	AO1 4.2.2.1 4.8.3.5

Question	Answers	Mark	AO / Spec. Ref.
01.6	 do **not** accept more than one line from a box on the left	1 1	AO1 4.8.3.2 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	yellow		1	AO1 4.8.3.4

Total Question 1	10

4.8.3.2 Metal hydroxides

Answer 16 · Examiner comments

June 2022 | 8462/2F | Original Q1

Question 1 (Low demand)

01.1 Around 70% of the students gained 2 marks. The boiling point of pure water was slightly better known than its pH.

01.2 Under half of the students gained this mark, with universal indicator being the most common correct answer and pH scale the most common incorrect response.

01.3 Around 70% of the students gained two marks. Use of a thermometer was the most common incorrect response.

01.4 Very well answered, with nearly 90% of the students gaining both of the marks. the majority both obtaining the correct answer and showing their working.

01.5 This was also very well answered, with more than three-quarters of the students scoring both marks.

01.6 Nearly 50% of the students gained a mark for knowing the flame colour of sodium is yellow.

01.7 Knowing that the halide ion test produces a white precipitate gained a mark for over 50% of the students.

4.8.3.2 Metal hydroxides

Answer 17 · Examiner comments June 2025 | 8462/2F | Original Q1

Question 1

01.1 Three quarters of students scored at least one mark on this item. The most common mark was for putting the wire into the flame. Students should be encouraged to state that the wire is placed in a blue flame when describing a flame test. Many students described the metal wire as being placed under, over or on a Bunsen with no mention of a flame.

01.2 There were nearly two thirds of students who scored at least one mark for this question. Students knew the flame colour for potassium more frequently than that for lithium.

01.3 Carbon dioxide was identified by two thirds of students.

01.4 Only a quarter of students correctly identified barium chloride solution. Sodium chloride solution was the most common distractor.

01.5 Fewer than 1 in 5 students correctly identified a precipitate as a solid. Most students gave a liquid as the answer.

01.6 Fewer than 20% of students correctly identified both precipitate colours. The most common error was identifying the copper precipitate as green. The magnesium precipitate was given the full range of colours available.

01.7 2 in 5 students correctly identified the iodide precipitate as yellow. The other options were both frequently seen.