

# Mark Scheme (Results)

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GCSE

360Science

GCSE Chemistry (5039)

## USING THE MARK SCHEME

1. This mark scheme gives you;
  - \* an idea of the type of response expected
  - \* how individual marks are to be awarded
  - \* the total mark for each question
  - \* examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
3. / means that the responses are **alternatives** and either answer should receive full credit.
4. ( ) means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
5. Phrases/words in **bold** indicate that the meaning of the phrase/word is **essential** to the answer.
6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

## MARKING

1. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
2. **Do not** award marks for repetition of the stem of the question.
3. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

## AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

**Unit 5039 / 01 (C3) Mark Scheme**

Question Number	Answer	Mark
1(a)	Li; [Reject li/ LI]	(1)
1 (b)	alkali metal(s); [Reject alkaline]	(1)
1 (c) (i)	sodium/ NaOH + water/ H <sub>2</sub> O; → (sodium hydroxide +) hydrogen/ H <sub>2</sub> [Reject H];	(2)
1 (c) (ii)	potassium/ K/ rubidium/ Rb/ caesium/ Cs/ francium/ Fr;	(1)
1 (c) (iii)	soap;	(1)
2 (a)	for drinking/ implied consumption; [Ignore cooking, washing etc.] (impurities/ bacteria) would cause illness etc; [Ignore 'unsafe' etc]	(2)
2 (b)	supplies limited/ droughts etc.; costs money; [Ignore references to non-home country]	(2)
2 (c) (i)	blue litmus goes red / pink; [Reject use of other indicators]	(1)
2 (c) (ii)	add (dil.) hydrochloric acid/HCl; add barium chloride/ BaCl <sub>2</sub> ; [1 <sup>st</sup> two points in either order] white precipitate/goes white; [Ignore any other added reagents]	(3)
2 (c) (iii)	add sodium hydroxide/ NaOH; white ppt/goes white; which dissolves in excess/ with more (NaOH);	(3)
2 (d)	to see if (EU) limits exceeded/ to find out how much (pollution/ Al <sup>3+</sup> ) present;	(1)
3 (a)	transition metals/ transition elements/ d-block;	(1)
3 (b)	Any two from: 1. high mpt; 2. conducts electricity; 3. coloured compounds / coloured ions; [Ignore coloured metals/ boiling point or any other properties]	(2)
3 (c) (i)	copper sulphate (solution)/ CuSO <sub>4</sub> / copper nitrate (solution) / Cu(NO <sub>3</sub> ) <sub>2</sub> ;	(1)

Question Number	Answer	Mark
3 (c) (ii)	(red-brown) solid/ copper (deposited)/ electrode gets bigger/ OWTTE;	(1)
3 (c) (iii)	(ions) gain electrons/ copper ions reduced; [Ignore number of electrons if stated]	(1)
4 (a)	$S + O_2$ ; $\rightarrow SO_2$ ; [Allow correct multiples]	(2)
4 (b) (i)	Any two from: 1. hydrophobic part into grease; 2. hydrophilic part into water; 3. surface tension of grease globule reduced; 4. grease globule (surrounded by detergent) can now dissolve; [Allow explanation of hydrophobic and hydrophilic for 1]	(2)
4 (b) (ii)	no scum/cleans without being wasted/ less detergent (than soap) required/ [detergent better arguments] soap does not lather well/ lot of soap would be required (for lather)/ use of soap gives scum; [soap ineffective arguments implies detergents better] [Ignore cost arguments]	(1)
4 (b) (iii)	'dissolves' (biological) stains faster/ at lower temperatures/ contain enzymes;	(1)
5 (a)	loss of electrons/ iron gets higher charge;	(1)
5 (b) (i)	red-brown / OWTTE; precipitate/solid/ sludge; [Ignore other observations]	(2)
5 (b) (ii)	$Fe^{3+} + 3 OH^- \rightarrow Fe(OH)_3$ ;;; Reactant ions; product; balancing of correct formulae [allow multiples]; [Ignore state symbols]	(3)
6 (a)	500 (dm <sup>3</sup> );	(1)
6 (b)	Ring around -O-H;	(1)
6 (c)	hydrogen/ H <sub>2</sub> ; [Reject H]	(1)
6 (d) (i)	methyl ethanoate; [No alternative spelling accepted]	(1)

6 (d) (ii)	$  \begin{array}{c}  \text{H} \quad \quad \text{O} \quad \text{H} \\    \quad \quad    \quad   \\  \text{H}-\text{C}-\text{O}-\text{C}-\text{C}-\text{H} \\    \quad \quad   \\  \text{H} \quad \quad \text{H}  \end{array}  $ <p>ester group ie R-O-(C=O)-; rest of molecule; [Allow ecf]</p>	(2)
7 (a)	$M_r(\text{CaCO}_3) = 100;$ $M_r(\text{Na}_2\text{CO}_3) = 106;$ Mass of $\text{CaCO}_3 = \frac{100}{106} \times 1 \times 10^6; = 943\,000$ (tonnes) [Mr; Mr; scaling; conversion to tonnes with 3-6 sig fig;] [943,000 = 4 marks 943,396 = 4 marks 0.943... million = 4 marks 1,060,000 = 3 marks 3-6 sig fig allowed for 4 <sup>th</sup> mark]	(4)
7 (b)	$\text{Na}_2\text{CO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{CO}_2 + \text{H}_2\text{O};;$ Reactants; $\text{Na}_2\text{SO}_4; \text{CO}_2 + \text{H}_2\text{O};$ [cannot score 3 with incorrect balancing] [Ignore state symbols]	(3)
8 (a)	no sharp change of colour/ range of colours/ OWTTE;	(1)
8 (b)	Any four from: 1. wash burette with acid, wash pipette with calcium hydroxide; 2. acid in burette, calcium hydroxide in pipette; 3. correct use of conical flask; 4. add drops/ small amount of methyl orange (to calcium hydroxide); 5. add acid slowly; 6. until indicator turns orange/red/pink; 7. swirl / stir to mix; 8. use of white tile; 9. repeat process to obtain reliable / concordant results/ results to within $0.2 \text{ cm}^3$ [Ignore to give average];	(4)
8 (c) (i)	$\frac{8.85 \times 0.05}{1000} = 0.0004425$ moles; [=4.425 x 10 <sup>-4</sup> , allow 2-4 sig fig]	(1)
8 (c) (ii)	$\frac{0.000445}{2} = 0.00022125$ moles; [Half of previous answer] [=2.2125 x 10 <sup>-4</sup> , allow 2-5 sig fig]	(1)

Question Number	Answer	Mark
8 (c) (iii)	$0.00022125 \times 10 = 0.0022125$ moles; [previous answer x 10] [=2.2125 x 10 <sup>-3</sup> , allow 2-5 sig fig]	(1)
8 (d)	Mass of Ca(OH) <sub>2</sub> = $0.0022125 \times 74 = 0.163725$ g; [previous answer x 74] [allow 2-6 sig fig]	(1)
8 (e)	Evaporate (all 100 cm <sup>3</sup> of solution) [if sample, eg 10 cm <sup>3</sup> used, must calculate correctly, eg x10]; Weigh residue [must calculate mass of solid, and not solvent];	(2)

TOTAL MARK 60