

# Mark Scheme (Results)

## Summer 2010

GCSE

360Science

GCSE Additional Science  
Structured Paper C2 (5018H/1H)

GCSE Chemistry  
Structured Paper C2 (5038H/1H)

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## 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.

Question Number	Answer	Mark
1(a)(i)	<p>1. <b>protons and neutrons</b> in nucleus / centre / middle ;</p> <p>2. <b>electrons</b> around (nucleus) / in shells / orbits / rings / energy levels ;            [Allow electrons in outer shell(s) for second mark]</p> <p>accept suitable labelled diagram ;;</p> <p>Ignore any numbers of sub-atomic particles</p>	(2)

Question Number	Answer	Mark
1(a)(ii)	<p>3 (protons)            3 (electrons)            4 (neutrons) ;;</p> <p>three correct = 2 marks            two correct = 1 mark            one correct = 0 marks</p>	(2)

Question Number	Answer	Mark
1(b)(i)	exothermic / oxidation / redox ;	(1)

Question Number	Answer	Mark
1(b)(ii)	$\text{Li}_2\text{O}$ / $\text{Li}^+_2\text{O}^{2-}$ / $(\text{Li}^+)_2\text{O}^{2-}$ ;	(1)

Question Number	Answer	Mark
1(c)(i)	<p><b>GROUP:</b> number of outer shell electrons / last number = <b>group</b> ;            [Allow example eg elements in group 1 have 1 outer electron]</p> <p><b>PERIOD:</b> number of shells / 'amount of numbers' = <b>period</b> ;</p>	(2)

Question Number	Answer	Mark
1(c)(ii)	<p>outer electron more easily lost / further from the nucleus / sodium has more shells / sodium has more shielding / outer shell further away ;</p> <p>Ignore sodium has more electrons</p>	(1)

Question Number	Answer	Mark
2(a)	$C_3H_6 / H_6C_3$ ;	(1)

Question Number	Answer	Mark
2(b)	<p>1. Correct repeating unit (with or without : brackets / n / continuation bonds) ;</p> <p>2. [Consequential on 1.] Two (or more) units shown (with or without continuation bonds) / n stated as 2 ;</p> <p>[Note: second propene molecule can be reversed in diagram]            [Any answer with double bonds = 0]</p>	(2)

Question Number	Answer	Mark
2(c)(i)	A - thermoplastic B - thermosetting	(1)

Question Number	Answer	Mark
2(c)(ii)	<p>thermosetting polymers / polymer B</p> <p>have cross-links / intermolecular bonds / bonds between chains ;</p> <p><b>OR</b></p> <p>thermoplastics / polymer A</p> <p>do not have cross-links / intermolecular bonds / bonds between chains ;</p>	(1)

Question Number	Answer	Mark
2(d)	<p>gives <math>CO_2</math> / CO / can make toxic fumes / greenhouse effect / global warming / polymer cannot be reused ;</p> <p>[Ignore <math>CO^2</math> / <math>CO_2</math> / harmful gases / ozone layer problems / pollution]</p>	(1)

Question Number	Answer	Mark
3(a)	$1.4 / 28 = 0.05$ ; $0.05 \times 2 \times 17 = 1.7$ (kg) ;  Or  ratio $2 \times 17/28$ ; $2 \times 17/28 \times 1.4 = 1.7$ (kg) ;  Or  28 (kg) nitrogen produces $\rightarrow$ 34 (kg) ammonia ; $1.4 \text{ kg} \rightarrow 34 \times 1.4 / 28 = 1.7$ (kg) ;  [Always give 2 marks for 1.7 (kg) or 1700g ]	(2)

Question Number	Answer	Mark
3(b)	equilibrium / reversible ;  so some nitrogen reforms / some ammonia decomposes ;  Note: answers other than those referring to equilibrium ignored	(2)

Question Number	Answer	Mark
3(c)	three shared pairs in $\text{NH}_3$ ;  Consequential on 1 <sup>st</sup> mark: lone pair / 2 non-bonded electrons ;  [Ignore inner shells if shown] [Diagram must show correct ammonia formula for any marks, but N and H do not need to be labelled]	(2)

Question Number	Answer	Mark
3(d)	<b>Bonds mark:</b> weak intermolecular forces/ bonds BETWEEN molecules ; [Must be specified as between molecules eg 'weak bonds' = 0]  <b>Energy mark:</b> requires little energy / heat to overcome ; [THIS mark awarded even if referring to N-H bonds]  [Ignore refs to temperature]	(2)

Question Number	Answer	Mark
4(a)	(sea of ) electrons free to move / delocalised ;	(1)

Question Number	Answer	Mark
4(b)	$\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2 ; ;$ all formulae correct [reject 2H / $\text{MgCl}^2$ / $\text{MgCl}_2$ etc] ; correct formulae balanced ;	(2)

Question Number	Answer	Mark
4(c)	1. particles gain energy / particles move faster ; [alternatives to particles will be allowed eg atoms / molecules / ions but not electrons]  2. more (frequent) collisions / more chance of colliding ;  <b>Third mark for activation energy point:</b> 3. collide with more energy/ 'harder' / more have activation energy / more will be 'successful' ;  ['More successful collisions' scores mark 3 only, NOT 2 and 3]	(3)

Question Number	Answer	Mark
4(d)	$\text{Mg}^{2+} + 2\text{e}^- \rightarrow \text{Mg} / \text{Mg}^{2+} + 2\text{e}^- \rightarrow \text{Mg} ;$	(1)

TOTAL MARK 30

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