

Mark Scheme (Results)

November 2008

GCSE

360Science

GCSE Additional Science C2 (5018H/1H)

GCSE Chemistry C2 (5038H/1H)

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. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The total mark awarded for a question should be written in the box at the end of the question.
2. The total marks for a question should then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. 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	Accept	Reject	Mark
1(a)	takes in heat/ energy ;	(causes) temperature decrease/ gets colder/ arguments in terms of bond breaking and making		(1)

Question Number	Answer	Accept	Reject	Mark
1(b)(i)	2 (HCl) ; Ignore any state symbols	multiples of equation	any other numbers given elsewhere (except 1), any changed chemical formulae eg HCl ₂ , H ₂ Cl, H ₂ Cl etc	(1)

Question Number	Answer	Accept	Reject	Mark
1(b)(ii)	carbon dioxide ;		CO ₂ / carbon oxide/ carbon monoxide	(1)

Question Number	Answer	Accept	Reject	Mark
1(b)(iii)	greater (surface) area;	more contact between solid/lumps and liquid/acid, more (frequent) collisions, more solid particles available	calcium carbonate is in smaller pieces	(1)

Question Number	Answer	Accept	Reject	Mark
1(b)(iv)	(more) concentrated acid/ raise temperature/heat ;	stronger/ lower pH (hydrochloric) acid	add catalyst, stir, change amount of any reactant (eg "add more acid")	(1)

Question Number	Answer	Accept	Reject	Mark
1(c)(i)	electrons are lost ; 2 (electrons) lost ;	give electrons (to other atom),	sharing / gaining electrons lose <u>both</u> marks	(2)

Question Number	Answer	Accept	Reject	Mark
1(c)(ii)	strong (forces of) attraction/bonds /lots of energy to break bonds; between ions/ionic (bonds);	strong (covalent) bonds = 1 mark electrostatic attraction = ionic bond	intermolecular forces	(2)

Question Number	Answer	Accept	Reject	Mark
2(a)	2, 4 / 2.4;	allow 2 4 in any format		(1)

Question Number	Answer	Accept	Reject	Mark
2(b)	number of outer shell electrons = group number ; (unspecified or 4)	(carbon) in group IV	where number of outer electrons incorrect	(1)

Question Number	Answer	Accept	Reject	Mark
2(c)	shared electron(s); pair of electrons;	shared electrons to give (atoms with) full outer shells;;		(2)

Question Number	Answer			Mark
2(d)	<p>GRAPHITE: layers slide/slip/ rub off OWTTE;</p> <p>C FIBRES: due to crumpled sheets etc is: stronger/ less flexible/ less slippery/ layers can't slide /OWTTE;</p>			(2)

Question Number	Answer	Accept	Reject	Mark
3(a)	<p>$Mg^{2+} + 2 e \rightarrow Mg ; ;$</p> <p>$Mg^{2+}$ and e on left, Mg on right; balancing correct species;</p>	<p>e or e⁻ Mg^{+2} $Mg^{2+} - 2 e \rightarrow Mg = 1$ mark only</p>	mg^{2+}	(2)

Question Number	Answer	Accept	Reject	Mark
3(b)	ions/particles free to move ;		atoms/molecules free to move	(1)

Question Number	Answer	Accept	Reject	Mark
3(c)	electrons can move / free electrons/delocalised electrons ;	electrons carry the charge	ions moving/ reference to molecules	(1)

Question Number	Answer	Accept	Reject	Mark
3(d)	layers cannot slide (over each other); due to particles of different size; [particles = atoms = ions]	particles cannot easily move past one another	molecules	(2)

Question Number	Answer	Accept	Reject	Mark
4(a)	bromine water is yellow / orange; turns colourless/ decolourises with ethene ; no change with poly(ethene) ;	red/ red-brown/ brown (any combination of these colours allowed) Stays orange etc/ no reaction	goes clear/ discolours	(3)

Question Number	Answer	Accept	Reject	Mark
4(b)	Two from: thermosetting polymers have (cross-) links ; to form giant structure ; thermoplastic polymers have no cross-links;	bonds between molecules suitable diagrams could score both marks		(2)

Question Number	Answer	Accept	Reject	Mark
4(c)(i)	e.g. solvents/ cleaning materials/ fuel/ antiseptic;	rubbing alcohol/ sterilising	dry cleaning/ nail varnish remover/ paint stripper/ medicines	(1)

Question Number	Answer			Mark
4(c)(ii)	<p>either :</p> <p>$28.0 \text{ g C}_2\text{H}_4 \rightarrow 46.0 \text{ g C}_2\text{H}_5\text{OH}$;</p> <p>$\frac{28}{46} \times 500\,000 \text{ tonnes C}_2\text{H}_4 \rightarrow 500\,000 \text{ tonnes C}_2\text{H}_5\text{OH}$;</p> <p>$= 304348/ 304\,000/300\,000/ 3 \times 10^5(\text{tonnes})$;</p> <p>or:</p> <p>$M_r \text{ ethanol} = 46$;</p> <p>Moles ethanol = $500\,000 / 46$;</p> <p>Mass ethene = $\frac{500\,000 \times 28}{46} = 304348/ 304000/300000/ 3 \times 10^5 (\text{tonnes})$;</p> <p>[allow 304347, 304347.8, 304347.82..... etc]</p>			(3)

TOTAL MARK 30