

Mark Scheme (Results)

November 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	Allow	Reject/ Ignore	Mark
1(a)(i)	covalent;	covalent	Reject any reference to ionic/ intermolecular	1
(ii)	4 ;			1
(iii)	strong / to break bonds;		Ignore force	1
(b)	1. made of layers / sheets ; 2. Cannot score this without 1 st mark can slide or move (easily) / weak forces (between layers)/ weak intermolecular bonds / weak bonds between layers ;		Ignore plates, crosslinks	2
(c)(i)	(carbon) nanotubes ;	graphene		1
(ii)	720 ;			1
(d)	CO ;			1
				(8)

Question Number	Answer	Allow	Reject/ Ignore	Mark
2(a)(i)	112 ;			1
(ii)	165			1
(iii)	numbers of neutrons / mass numbers / (relative atomic) mass ;		Reject incorrect refs to electrons / protons	1
(b) (i)	CpF ₂ ;	Cp ²⁺ (F ⁻) ₂	Reject CpF ²	1
(ii)	copernicium atom loses two electrons ; (each) fluorine atom gains 1 electron ;	Correct direction of transfer (for 1 mark only);		2
				(6)

Question Number	Answer	Allow	Mark
3(a)	Sea of electrons / delocalised electrons / free electrons ; (electrons) can move ;	Electrons are free to move / freely moving electrons - worth only 1 mark	2
(b)	Any two from: titanium atoms bigger / atoms of different sizes ; disrupt regular lattice OWTTE; stop layers from sliding ;	Allow particles instead of atoms Reject molecules etc Allow 'particles not in a straight line'	2
(c)	48 g Ti → 80 g TiO ₂ ; $\frac{80}{48} \times 9.6 = 16 \text{ (g) ;}$	16 (g) = 2 marks	2
			(6)

Question Number	Answer	Allow	Mark
4(a)	reaction is reversible / (can reach) equilibrium ;		1
(b)	to make more ammonia OWTTE / to avoid waste (of chemicals or money) ;	To be used again	1
(c)(i)	Any temp(s) within range 360 - 370 °C ;		1
(ii)	increases ;	Ignore references to yield	1
			(4)

Question Number	Answer	Reject/ Ignore	Mark
5(a)	propene ;	Reject propane	1
(b)	Any two from: 1. uses up fraction in less demand / more demand for products 2. too much of one fraction / 3. smaller more useful molecules are produced / 4. to produce alkanes and alkenes / 5. (octane is used) to make petrol / 6. to make polymers (from alkenes) / 7. to make ethanol (from ethene);;		2
(c)	four shared electrons (as x or • or mixture) between the two carbon atoms and no additional electrons ;	Ignore H ₂ O	1
(d) (i)	Either in equation or answer line: water / steam;		1
(ii)	90.24% / 90.2% / 90%		1
			(6)

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