

Mark Scheme (Results) Summer 2007

GCSE

GCSE Science (1522/5H)

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 mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total written and ringed at the end of the question 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.

QUALITY OF WRITTEN COMMUNICATION

Students will be assessed on their ability to:

present relevant information in a form that suits its purpose

ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear

use a suitable structure and style of writing.



1.	a	i	chlorine / Cl ₂ ; [Reject Cl]	1
		ii	hydrogen / H ₂ ; [Reject H]	1
		iii	sodium hydroxide / NaOH;	1
	b	i	both atomic number 35 / same protons; [Ignore electrons]	1
		ii	isotopes;	1
	c	i	2Na(s) + Br ₂ (l) → 2NaBr(s) formulae; balancing; state symbols for recognisable formulae;	3
		ii	1 electron from outer Na shell to outer Br shell;	1
		iii	ions;	1
		iv	ionic;	1
	d		Any three from: 1. sediments laid down/layers; 2. pressure (from upper layers); 3. water squeezed out; 4. salts left behind; 5. long time period/>million years;	3
			plus one communication mark for using a suitable structure and style of writing	1

Total 15 marks

2.	a	i	2,2 (both required); (g) (g/l) (both required);	2
		ii	covalent;	1
		iii	shared pair between H and O; rest of diagram correct;	2
	b	i	(compound) containing hydrogen and carbon; only; [Reject mixtures]	2
		ii	natural gas / cows / crude oil / volcanoes / decaying biomass;	1
	c		toxic gas / combines with haemoglobin / red corpuscles; colourless / odourless gas;	2
			plus one communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear	1
	d		mixture has smaller carbon content; hydrogen burns to form water only / does not form CO ₂ ;	2

Total 13 marks

- 3.
- | | | |
|---|----------------------------------------------------------------------------------------|---|
| a | 1; +1; (in) nucleus; | 3 |
| b | 19;
20;
19; | 3 |
| c | 2,8,8; 1; | 2 |
| d | in group 7 / no. of outer shell electrons = group no.;
[Ignore halogens] | 1 |
| e | dissolves/disappears;
to form a colourless solution;
[Reject K reactions] | 2 |
| f | both have 7 / same electrons / need 1 more electron;
in the outer shell; | 2 |

Total 13 marks

- 4.
- | | | |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| a | (i) chlorine is more reactive than bromine;
so it displaces bromine; | 2 |
| | (ii) $2 \text{NaBr} + \text{Cl}_2 \rightarrow 2 \text{NaCl} + \text{Br}_2$;;;
reactants;
products;
balancing correct formulae; | 3 |
| b | (bromine water is) orange / red-brown / yellow / brown;
with unsaturated hydrocarbons, turn colourless / decolourised;
with saturated hydrocarbons, no change / remains orange; | 3 |
| c | (i) pH <7; | 1 |
| | (ii) acidic solution / hydrobromic acid / contains H ⁺ ;
[Reject H] | 1 |

Total 10 marks

- 5.
- | | | |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| a | (i) caesium hydroxide / CsOH; [Reject CsHo] | 1 |
| | (ii) $2 \text{Cs} + 2 \text{H}_2\text{O} \rightarrow 2 \text{CsOH} + \text{H}_2$;;; [Allow CsHo / OHCS / HOCS]
reactants;
products;
balancing correct formulae; | 3 |
| | (iii) more violent than the other metals;
similar products (hydroxide / hydrogen + alkali) formed; | 2 |
| b | caesium is a soft metal;
caesium has a low melting point / 29 °C; | 2 |

Total 8 marks

- 6.
- | | | |
|---|-------------------------------------------------------------------------------------------------------------------------------------|---|
| a | >C=C<;
rest of molecule; | 2 |
| b | Any three from:
1. more energy;
2. move faster;
3. more collisions;
4. more collisions are successful / more have EACT; | 3 |
| c | CH ₂ ; | 1 |
| d | >C=C<;
rest of molecule; | 2 |

Total 8 marks

- 7.
- | | | |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| a | 3O ₂ ⇌ 2O ₃
formulae;
balancing;
equilibrium sign; [Reject ⇌] | 3 |
| b | Any three from:
1. plants → oxygen (in photosynthesis);
[Reject breathing]
2. animals need oxygen to respire / breathe;
3. oxygen → ozone (layer);
4. ozone protects from UV that kills animals;
[Ignore food arguments] | 3 |
| c | magnesium atoms lose electrons - oxidation ;
oxygen atoms gain electrons - reduction ;
[Allow Mg electron loss/O gain or redox reaction / OILRIG for 1 mark] | 2 |
| | plus one communication mark for presenting relevant information in a form that suits its purpose | 1 |
| d | LiNO ₃ = 69, O ₂ = 32;
138 → 32;
10 → 32 x 10 / 138 = 2.3;
[1.2g or 4.6 g = 2 marks] | 3 |

Total 12 marks

- 8.
- | | | | | | | | | | | | | | | | | |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---|----|----------------|-------|----------------|-------|--------|-------|----|----------------------|------------------------------------------|-------------------------------|---|--|
| a | cheaper / less energy required; | 1 | | | | | | | | | | | | | | |
| b | aluminium oxide too stable/aluminium too reactive;
Al above C in reactivity series / ORA; | 2 | | | | | | | | | | | | | | |
| c | 3e; Al;
$2O^{2-} \rightarrow O_2$; 4e; | 4 | | | | | | | | | | | | | | |
| d | <table border="0" style="margin-left: 20px;"> <tr> <td>Fe</td> <td>O</td> </tr> <tr> <td>70</td> <td>30; (g oxygen)</td> </tr> <tr> <td>70/56</td> <td>30/16; (/ Ar)</td> </tr> <tr> <td>=1.25</td> <td>=1.875</td> </tr> </table>
<table border="0" style="margin-left: 20px;"> <tr> <td>/1.25</td> <td>=1</td> <td>=1.5; (simple ratio)</td> </tr> </table>
<table border="0" style="margin-left: 20px;"> <tr> <td>Formula Fe₂O₃;</td> <td>(ratio \rightarrow formula)</td> <td>4</td> </tr> </table> | Fe | O | 70 | 30; (g oxygen) | 70/56 | 30/16; (/ Ar) | =1.25 | =1.875 | /1.25 | =1 | =1.5; (simple ratio) | Formula Fe ₂ O ₃ ; | (ratio \rightarrow formula) | 4 | |
| Fe | O | | | | | | | | | | | | | | | |
| 70 | 30; (g oxygen) | | | | | | | | | | | | | | | |
| 70/56 | 30/16; (/ Ar) | | | | | | | | | | | | | | | |
| =1.25 | =1.875 | | | | | | | | | | | | | | | |
| /1.25 | =1 | =1.5; (simple ratio) | | | | | | | | | | | | | | |
| Formula Fe ₂ O ₃ ; | (ratio \rightarrow formula) | 4 | | | | | | | | | | | | | | |

Total 11 marks

TOTAL MARK 90