

Edexcel GCSE

Chemistry A 1530

Paper 4H

Summer 2006

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Mark Scheme

Edexcel GCSE

Chemistry A 1530

N26727A

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) solid / precipitate / suspension; 1
- (b) An explanation to include:
 1. layer of calcium sulphate forms;
 2. which is insoluble / creates a barrier to further attack; 2
- (c) (i) dissolves; 1
- (ii) makes water alkaline; 1

Total 5 marks

2. (a) too brittle / weak; 1
- (b) lowers the carbon content /
 converts carbon to carbon monoxide / dioxide /
 removes / oxidises impurities; 1
- (c) (i) eg stainless steel; 1
- (ii) eg cutlery;
 [Use dependent on steel named] 1
- (d) (i) alloys are stronger; 1
- (ii) A suggestion to include two from:
 1. aluminium alloys lighter;
 2. aluminium alloys stronger;
 3. aluminium does not corrode;
 4. less fuel used / expand reason eg faster; 2

plus one communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear 1

Total 8 marks

3. (a) Completion of diagram to show:
 1. gas syringe connected / upturned burette over water/
 upturned measuring cylinder over water;
 2. graduated markings; 2
- (b) (hydrogen-air mixture is) explosive / flammable; 1
- (c) A description to include:
 1. lighted splint;
 2. 'pops' / gas burns quietly (if pure); 2

- (d) (i) ensures all acid has reacted; 1
- (ii) A description to include:
 1. evaporate solution (to concentrate it) / leave to one side;
 2. to cool / crystallize;
 3. dry crystals; 3

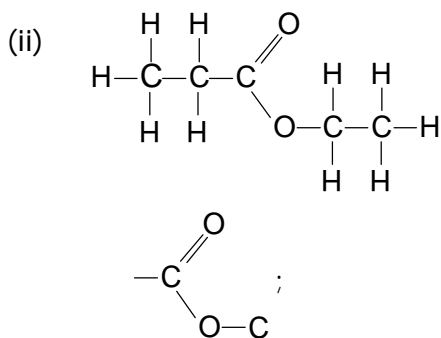
Total 9 marks

4. (a) chalk / gypsum / marble / or other suitable rock; 1
- (b) (i) An explanation to include:
 1. stops (metal) pipes from corroding /
 lead contact with water;
 2. lead (ions formed are) harmful; 2
- (ii) blocks pipes / or similar; 1
- (c) (i) A description to include two from:
 1. dissolve small amount of solid in water;
 2. add (drops of) soap solution;
 [Allow mix salt with soap solution for 1 mark]
 3. (stopper and) shake; 2
- (ii) potassium chloride; 1

Total 7 marks

5. (a) $C_2H_4 + H_2O$; 1
- (b) (i) O-H circled; 1
- (ii) An explanation to include:
 1. same functional group / all have -OH /
 similar chemical properties /
 gradual changing physical properties; 2
 2. each member differs by CH_2 unit /
 same general formula;
- (c) (i) A description to include:
 1. suitable reaction eg react with magnesium /
 carbonate; 2
 2. result, eg H_2 gas evolved / CO_2 ;
- [Accept named indicator with correct colour for 1 mark] 1

plus one communication mark for using a suitable structure and style of writing (sentences or bullet points)



rest of molecule correct;

2

Total 9 marks

6. (a) (i) 50 dm³; 1
- (ii) 100 dm³; 1
- (b) Any three from:
1. more SO₂ and O₂ formed / less SO₃ / more reactants/ less products; [substance]
 2. exothermic reaction is forward direction / ORA; [energetics]
 3. equilibrium moves to favour the left; [equilibrium]
 4. equilibrium attained quicker; [rate]
- (c) SO₃ + H₂O; → H₂SO₄; 2
- reactants;
- products;

Total 7 marks

7. (a) obtain concordant / reliable results / OWTTE; 1
- [Reject checking final titration / accurate]
- (b) A description to include four from:
1. acid in burette and carbonate in pipette;
 2. white tile under the conical flask;
 3. add drops;
 4. of named indicator (e.g. methyl orange); [Reject universal indicator]
 5. swirl while adding acid;
 6. slowly;
 7. correct colour change at end-point;
- (c) (i) **Either**
- $$\frac{20.15 \times 0.100}{1000} = 0.002015 \text{ moles;}$$
- 2
- (ii)
- $$\frac{\text{answer from part (c)(i)}}{2} = 0.00101 \text{ moles;}$$
- 1

(iii) $\frac{\text{answer from part (c)(ii)} \times 1000}{10}; = 0.101 \text{ mol dm}^{-3};$ 2

or

10.0 cm³ x mol dm⁻³ sodium carbonate solution react
with = 20.15 cm³ 0.100 mol dm⁻³ acid

$$\frac{\text{no of moles of sodium carbonate reacting}}{\text{no of moles of hydrochloric acid reacting}} = \frac{\frac{10.0x}{1000}}{\frac{20.15 \times 0.100}{1000}};$$

$$= \frac{1}{2};$$

$$\frac{10.0x}{20.15 \times 0.100} = \frac{1}{2}$$

$$x = \frac{20.15 \times 0.100}{2 \times 10.0};$$

$$= 0.1007$$

$$= 0.101 \text{ mol dm}^{-3};$$

or

use $\frac{m_1 v_1}{n_1} = \frac{m_2 v_2}{n_2}$

- (d) A calculation to include:
1. 106;
2. x 0.250 = (26.5 dm⁻³); 2

- (e) Ag⁺(aq) + Cl⁻(aq); → AgCl(s);
reactants;
products;
correct state symbols; 3

Total 15 marks

TOTAL MARK 60