

# Examiners' Report

## Summer 2010

GCE

### GCE08 Chemistry 6CH06

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at [www.edexcel.com](http://www.edexcel.com).

If you have any subject specific questions about the content of this Examiners' Report that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:

<http://www.edexcel.com/Aboutus/contact-us/>

Alternately, you can speak directly to a subject specialist at Edexcel on our dedicated Science telephone line: **0844 576 0037**.

Summer 2010

Publications Code UA023640

All the material in this publication is copyright  
© Edexcel Ltd 2010

## Contents

6CH06/1A report	4
6CH06/1B report	8
Statistics	12

## 6CH06/1A

### General

This was the first time that the component had been examined. The assessment tasks worked well giving the expected observations and values at least for some candidates in most centres. The great majority of candidates have been assessed rigorously and correctly.

Comments and feedback from centres on the (AS) 6CH03 internal assessment unit in summer 2009 had been noted by the moderators and led to changes to some of the (A2) 6CH06 tasks before their publication.

No centre submitted their own centre designed tasks for the b, c and d activities. On the other hand, one centre had its multi-stage task approved for use by its candidates.

Some centres do need to check that they are administering the requirements of the internal assessment unit correctly. In particular, the sample of candidates' work sent to the moderators was often incomplete and led to moderators having to get back to centres to ask for more information or for missing samples.

All centre assessors are advised to read this report and the equivalent one for 6CH03/1A and to use much of it as a checklist when submitting sample in 2011.

### Comments on the administration of the unit

Some comments made in the 6CH03/1A report also apply to this unit.

- Some centres incorrectly sent their 6CH03 and 6CH06 samples of work together to the same moderator. Please note that these AS and A2 units are moderated by different moderators, therefore Edexcel will normally allocate different moderators to the two components.
- Moderators find it much easier to follow teachers' award of marks if the accepted marking practice of one tick for one mark is used. This was not always the case from some centres.
- If a candidate in the required sample of work has withdrawn or absent, then another sample from a candidate with the same or a similar mark must be provided as replacement for the withdrawn or absent candidate. Similarly if the work of the lowest scoring candidate is unavailable then the work of the next to the lowest should be included in the sample to the moderator.
- The 'c + d' space on the record sheet is for the multi-stage mark. It should be left blank for those candidates who have completed separate c and d tasks.
- Moderators saw evidence from a few centres that suggested work was not given back to candidates for completion in a second session. If a task is unable to be completed in a single session then it may be returned to candidates for completion of a graph or calculation etc, provided that controlled conditions are maintained.

As with the 6CH03 unit, accuracy marks can only be awarded in activity c tasks by comparing a candidate's actual value with an expected one based on the teacher's completion of the task. For A2C1 and A2C3 the moderator should be supplied with

the teacher's values on a copy of the Teacher's Values form. The expected values should be annotated on the candidate's work.

## Assessments

### Activity a (GPC)

There have been many questions to the Principal Moderator about the core practicals or GPC tasks. Candidates will develop a better understanding and knowledge of many topics in the specification if they have laboratory experience of the chemistry involved. By carrying out at least some of the core practicals listed in the specification, candidates will gain this understanding and knowledge. However, Edexcel does not provide actual experiments for the core practicals. Centres have the freedom to choose their own experiments that will most benefit their own candidates.

Centres may list non-counting assessment tasks as the GPC tasks on the record sheet, although they were not designed for this purpose. No exercise must be included as **both** an activity a **and** b, c or d task on a record sheet.

By signing the record sheet candidates and teachers are authenticating that the core practicals were carried out on the dates specified. No further evidence is needed. Marks are not given to the GPC tasks. The moderator does not require samples of the GPC tasks.

### Activity b Qualitative observation

The tests in all four tasks gave the expected results for most candidates. When teachers decide to give credit for an observation that does not match those in the mark scheme it is vital that the work is annotated to explain the marking.

- Some centre assessors appeared to think that a formula or equation close to that in the mark scheme was acceptable. This is not the case. If only one mark is available for an equation or formula then it must be wholly correct.
- When sodium hydroxide or ammonia solution is added to a transition metal ion solution "until there is no further change" candidates should be taught to add the reagent drop by drop while gently shaking the test tube. They should record the colour of the precipitate formed and whether or not the precipitate dissolves in excess reagent. If the precipitate does dissolve then the colour of the solution formed should be recorded.
- The moderators were pleased that teachers marked inferences consequentially. This was especially the case in A2B4. The structure of the ester drawn in (d) had to follow the structures of the alcohol and carboxylic given earlier.
- Although zinc is not classed as a transition metal it is included in the list of "transition metal ions" in topic 5.3.2j of the specification. Candidates should be made aware that an A2B task based on transition metal chemistry may include a zinc(II) compound.

The four tasks available for submission in summer 2010 are no longer valid and must not be used for assessment of this activity in 2010-2011 academic year. However, these old tasks may be used as practice exercises, since they are no longer secure.

Four new replacement tasks are to be found on the Chemistry subject page of the Edexcel secure website.

## Activity c Quantitative measurement

### A2C1

To score the first mark in (a) the graph, rather than the scales should cover at least half of the graph paper in either direction. In part (b) candidates are expected to read the volume,  $V \text{ cm}^3$ , at which the pH is half-way along the near vertical section of the graph. This is, in fact, the equivalence point. The term neutralisation is used in the assessment since this is used in topic 4.7.1 of the specification.

### A2C2

It was not always clear from the candidates' results tables whether times such as 1.17 were in minutes and seconds or in minutes only. Candidates may well benefit from some guidance on this point since when they were plotted on the graph the times were usually read as decimal points rather than minutes and seconds.

### A2C3

For well-rehearsed candidates this proved to be a successful and high scoring assessment. Teachers should use the mark scheme as a guide to the precision and accuracy expected from candidates when reading and recording masses and burette volumes. An appropriate number of significant figures for the calculations is three and candidates should be made aware of this fact.

In order to check the candidate's titre for accuracy, the mass and titre obtained by the teacher should be sent to the moderator with the sample of work-preferably on a Teacher's Values form. Also the expected titre and difference (d) between this and the candidate's titre should be written on the work.

### A2C4

This was the most challenging of the four activity c exercises with some candidates failing to cope with the calculation of the gradient of the graph. For many others, however, this proved to be a high scoring assessment with maximum marks often being gained.

## Activity d Preparation

### A2D1

There were a surprisingly large number of candidates who subtracted incorrectly in Tables 1 and 2. Some candidates recorded a very wide range of temperatures in Table 3 indicating, perhaps, that the sample of aspirin was not fully dry. Further evidence for this was given by some unlikely high yields of close to 100%. A possible reason for a very low yield is that some aspirin remained in solution at point 7 in the procedure.

### A2D2

This relatively straight-forward preparation was the most popular of the three activity d tasks. If a candidate makes an error in calculating the maximum yield in part (a) then the teacher should use a corrected value to obtain a new percentage yield in (b). In part (c)(ii) teachers were often over-generous in their interpretation of the mark scheme.

### A2D3

This well tried and tested preparation again gave good results for many candidates. The moderators accept that a description of the crystals as being white should be

awarded the mark if the teacher confirms this colour. In part (c)(ii) an acceptable reason for a low yield is that this is due to transfer losses.

### Multi-stage activity

#### A2M1

A small number of centres took the opportunity to assess their candidates using this extended task. Within a centre it is allowed for some candidates to submit this task and for others to use separate c and d tasks as part of their mark profile.

### Summary

The moderators would like to thank centre assessors, candidates and technicians for their part in the implementation of the 6CH06 internal assessment unit, in its first year. Centre assessors must ensure that they are using the correct assessment tasks for submission in 2011.

Centre assessors are encouraged to ask the Principal Moderator for guidance on the scheme through Ask the Expert. They may also find the document "Guidance for centres: Internally assessed units" useful.

### Hints for revision

- When you add a reagent to a solution in a test tube shake the test tube gently during the addition.
- You should plan your scales for a graph so that the graph uses at least half of the grid in both directions.
- A mean titre should be written to the nearest  $0.05 \text{ cm}^3$  or to the second decimal point.

Make sure that you can interpret NMR spectra. In particular, understand the significance of the number of peaks in a spectrum.

## 6CH06/1B

### General

This was the first time that the component had been examined. The assessment tasks worked well, giving the expected observations and values at least for some candidates in most centres.

Comments and feedback from centres on the 6CH03 unit in summer 2009 led to changes to some 6CH06 tasks before their publication.

Some centres do need to check that they are administering the requirements for this unit correctly. In particular, candidates' work sent to examiners was often incomplete and led to examiners having to get back to centres to ask for more information or for missing work.

All teachers entering candidates for the 2011 examination are advised to read this report and the equivalent one for 6CH03/1B and to use much of it as a checklist when submitting work 2011.

### Comments on the administration of the unit

Some comments made in the 6CH03.01B report also apply to this scheme.

- Some centres incorrectly sent their 6CH03 and 6CH06 samples of work together to the same examiner. Please note that these AS and A2 units are examined by different examiners, therefore Edexcel will normally allocate different examiners to the two components
- Examiners saw evidence from a few centres that suggested work was not given back to candidates for completion in a second session. If a task is unable to be completed in a single session, then it may be returned to candidates for completion of a graph or calculation etc, provided that controlled conditions are maintained.

As with the 6CH03 unit, accuracy marks can only be awarded in activity c tasks by comparing a candidate's actual value with an expected one based on the teacher's completion of the task. For A2C1 and A2C3 the examiner should be supplied with the teacher's values on a copy of the Teacher's Values form.

### Assessments

#### Activity a (GPC)

There have been many questions to the Principal Examiner about the core practicals or GPC tasks. Candidates will develop a better understanding and knowledge of many topics in the specification if they have laboratory experience of the chemistry involved.

By carrying out at least some of the core practicals listed in the specification candidates will gain this understanding and knowledge. However Edexcel does not provide actual experiments for the core practicals. Centres have the freedom to choose their own experiments that will most benefit their own candidates.

Centres may list non-counting assessment tasks as the GPC tasks on the record sheet although they were not designed for this purpose. No exercise must be included as **both** an activity a and b, c or d task on a record sheet.



By signing the record sheet candidates and teachers are authenticating that the core practicals were carried out on the dates specified. No further evidence is needed. Marks are not given to the GPC tasks. The examiner does not require samples of the GPC tasks.

### Activity b Qualitative observation

The tests in all four tasks gave the expected results for most candidates. If teachers agree with an observation recorded by their candidates, but it does not match those in the mark scheme then a note should be included to the examiner explaining the situation.

- Many formulae and equations close to those in the mark scheme were seen. However, if only one mark is available for an equation or formula then it must be wholly correct to be awarded the mark.
- When sodium hydroxide or ammonia solution is added to a transition metal ion solution “until there is no further change” candidates should be taught to add the reagent drop by drop while gently shaking the test tube. They should record the colour of the precipitate formed and whether or not the precipitate dissolves in excess reagent. If the precipitate does dissolve then the colour of the solution formed should be recorded.
- As explained in the mark schemes the examiners marked inferences consequentially. This was especially the case in A2B4. The structure of the ester drawn in (d) had to follow the structures of the alcohol and carboxylic given earlier.
- Although zinc is not classed as a transition metal it is included in the list of “transition metal ions” in topic 5.3.2j of the specification. Candidates should be made aware that an A2B task based on transition metal chemistry may include a zinc(II) compound.

The four tasks available for submission in summer 2010 are no longer valid and must not be used for assessment of this activity in 2010-2011 academic year. However, these old tasks may be used as practice exercises, since they are no longer secure.

Four new replacement tasks are to be found on the Chemistry subject page of the Edexcel secure website.

### Activity c Quantitative measurement

#### A2C1

To score the first mark in (a) the graph, rather than the scales should cover at least half of the graph paper in either direction. In part (b) candidates are expected to read the volume,  $V \text{ cm}^3$ , at which the pH is half-way along the near vertical section of the graph. This is, in fact, the equivalence point. The term neutralisation is used in the assessment since this is used in topic 4.7.1 of the specification.

#### A2C2

It was not always clear from the candidates’ results tables whether times such as 1.17 were in minutes and seconds or in minutes only. Candidates may well benefit from some guidance on this point since when they were plotted on the graph the times were usually read as decimal points rather than minutes and seconds.

### **A2C3**

For well-rehearsed candidates this proved to be a successful and high scoring assessment. Teachers should use the mark scheme as a guide to the precision and accuracy expected from candidates when reading and recording masses and burette volumes. An appropriate number of significant figures for the calculations is three and candidates should be made aware of this fact.

In order to check the candidate's titre for accuracy the mass and titre obtained by the teacher should be sent to the moderator with the sample of work-preferably on a Teacher's Values form. The examiners can then calculate the expected titre and difference (d) between this and the candidate's titre.

### **A2C4**

This was the most challenging of the four activity c exercises with some candidates failing to cope with the calculation of the gradient of the graph. For many others, however, this proved to be a high scoring assessment with maximum marks often being gained.

## **Activity d Preparation**

### **A2D1**

There were a surprisingly large number of candidates who subtracted incorrectly in Tables 1 and 2. Some candidates recorded a very wide range of temperatures in Table 3 indicating, perhaps, that the sample of aspirin was not fully dry. Further evidence for this was given by some unlikely high yields of close to 100%. A possible reason for a very low yield is that some aspirin remained in solution at point 7 in the procedure.

### **A2D2**

This relatively straight-forward preparation was the most popular of the three activity d tasks. If a candidate made an error in calculating the maximum yield in part (a) then the examiner used a corrected value to obtain a new percentage yield in (b).

### **A2D3**

This well tried and tested preparation again gave good results for many candidates. The examiners accept that a description of the crystals as being white should be awarded the mark. In part (c)(ii) an acceptable reason for a low yield is that this is due to transfer losses.

## **Multi-stage activity**

**A2M1** A small number of centres took the opportunity to assess their candidates using this extended task. Within a centre it is allowed for some candidates to submit this task and for others to use separate c and d tasks as part of their mark profile.

## Summary

The examiners would like to thank teachers, candidates and technicians for their part in the implementation of the 6CH06 internal assessment unit, in its first year. Teachers must ensure that they are using the correct assessment tasks for submission in 2011.

Teachers are encouraged to ask the Principal Examiner for guidance on the scheme through Ask the Expert. They may also find the document "Guidance for centres: Internally assessed units" useful.

## Hints for revision

- When you add a reagent to a solution in a test tube shake the test tube gently during the addition.
- You should plan your scales for a graph so that the graph uses at least half of the grid in both directions.
- A mean titre should be written to the nearest 0.05 cm<sup>3</sup> or to the second decimal point.

Make sure that you can interpret NMR spectra. In particular, understand the significance of the number of peaks in a spectrum.

## Appendix A: Grade boundaries

### 6CH06/1A

Grade	Max mark	A*	A	B	C	D	E
Raw boundary mark	40	38	37	33	29	25	22
Uniform boundary Mark	60	54	48	42	36	30	24

### 6CH06/1B

Grade	Max mark	A*	A	B	C	D	E
Raw boundary mark	40	38	37	33	29	25	22
Uniform boundary Mark	60	54	48	42	36	30	24

**Maximum Mark (Raw):** The mark corresponding to the sum total of the marks shown on the mark scheme.

**Boundary Mark:** The minimum mark required by a candidate to qualify for a given grade.

Further copies of this publication are available from  
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467  
Fax 01623 450481

Email [publications@linneydirect.com](mailto:publications@linneydirect.com)

Order Code UA023640 Summer 2010

For more information on Edexcel qualifications, please visit [www.edexcel.com/quals](http://www.edexcel.com/quals)

Edexcel Limited. Registered in England and Wales no.4496750  
Registered Office: One90 High Holborn, London, WC1V 7BH