edexcel
advancing learning, changing lives

Examiners' Report Summer 2009

GCE

GCE Chemistry (8CH01)

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

A PEARSON COMPANY

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.

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 2009

Publications Code US021182

Contents

6CH03

Centres had the option of either entering candidates for 1A; coursework which was marked internally by teachers and samples sent to moderators or 1B; coursework which was marked externally by examiners. The tasks for both options were identical. Reports for both options should be read as many of the points discussed are common.

6CH03/1A

General

It is pleasing to report that the scheme of internal assessment of laboratory skills has been largely successful in the first year of the new specification. The majority of candidates in most centres were rigorously and fairly assessed using the Edexcel tasks under the controlled conditions demanded by the scheme. The administration of the scheme was generally good although some centres do need to make small changes to their procedures for 2009-2010. There were some marking differences between the moderators and centre assessors. All centres assessors need to be aware of the revisions made to the assessment tasks from September, 2009.

Comments on the administration of the scheme

The administration of the Unit 6 internal assessment scheme will be identical to that of Unit 3 so points made here will apply equally to both units in 2009-2010.
These comments may serve as a useful check list for centre assessors.

- The sample of work sent to the moderator need only include that of the candidates asterisked on the OPTEMS or its equivalent plus the candidates scoring the lowest and highest mark if these are not already included. Neither work nor record sheets from any other candidates should be sent to the moderator.

- Work in the sample should be collated with the candidate's record sheet attached to his or her three assessment tasks. The work should be removed from any folders or files although it is acceptable to have each candidate's work in a plastic wallet.

- For the activity c tasks it is essential that the expected values of temperature or titre are annotated on each candidate's work. It is also useful if teacher values are listed on the Teacher's Values Form. Copies of spread sheets or marking grids used by the teachers should be included. Without this information the moderators are unable to follow the award of marks for accuracy and range in activity c.

- If two or more teachers mark the assessment tasks in the same centre the moderator should have evidence that internal standardisation has taken place. The most convincing evidence is when two teachers have marked the same tasks in different coloured ink and annotated the work to explain any differences in the award of marks. If just one teacher has been responsible for the marking a note to explain this is much appreciated by the moderator.

- The moderator will complete an E9 feedback form for each centre. This may include comments to explain any errors made by the centre in its implementation of the scheme. It is essential that centre assessors note the contents of the E9 taking appropriate action, if necessary, to correct any shortcomings.

- All of the AS assessments will be revised for 2009-2010. **The activity b tasks are new** although very much in the same format as the ones used previously. Minor changes have been made to the c and d tasks. It is therefore, vital, that centre assessors download the revised tasks from the secure website and use only these for their candidates entering 6CH03/01A in summer, 2010.

Assessments

Activity a (GPC)

Throughout the year there have been many questions from centre assessors as to the exact details of what is demanded by Edexcel for core practicals and the entry on the record sheet for this activity. Here are the main points about activity a.

- In the specification there are suggestions as to the topics for which a greater knowledge and understanding of the chemistry may be gained by having candidates carry out laboratory work. These are listed as Core Practicals (CPs).

- The choice of experiments within a centre to cover the demands of the specification is left to the teachers in charge of the course. Edexcel does not provide details of core practicals.

- The titles or codes (CP1 etc) of five core practical tasks carried out by a candidate must be listed on his or her record sheet along with dates on which they were carried out. No marks are required for these tasks. The five tasks must include at least one each of an inorganic, physical and organic exercise.

- The moderator does not need any samples of the work or any more details than are on the record sheet for this activity.

- It is acceptable to list as activity a tasks assessment exercises for which the marks are not included in the candidate's total mark. However, an exercise must not be counted for both activity a and b, c or d.

Activity b Qualitative observation

The four tasks available in 2008-2009 are no longer valid and must not be used for assessment of this activity in 2009-2010. Four replacement tasks are to be found on the secure web site.

These were more marking differences between teacher and moderators in this activity than on either of the others. This was due to some teachers being over-generous in their interpretation of the mark scheme. Since the tests in the new tasks are much the same as those previously used it is important that all markers and moderators are consistent in their interpretation of these mark scheme points.

- If a compound has to be identified by giving its formula then no credit should be given for its name.

- When silver chloride or silver bromide dissolve in aqueous ammonia a colourless, solution is formed. There should be no mark given for references to “goes clear”.

- Candidates should be taught that when two aqueous salt solutions are mixed any observation of the formation of a solid or cloudiness may be described as a “precipitate”. The term “white solution” should never be used nor given any credit.

- When an organic liquid is mixed with water either the two are miscible forming a solution or are not miscible so will form layers. If they are miscible then this indicates that the organic compound has polar molecules or forms hydrogen bonds with water.

- If two compounds react to form a gas then the accepted observation is that “effervescence” or “bubbles” are seen. An observation that “hydrogen is given off” when sodium reacts with an alcohol is not acceptable since no test has been carried out on the gas.

- When phosphorus (V) chloride reacts with an alcohol or concentrated sulfuric acid reacts with a solid chloride, “steamy fumes” are observed just inside the mouth of the test tube. It is only if the gas emerging from the tube comes into contact with ammonia that “white smoke” is seen.

The mark schemes for the new tasks are more detailed than on the four used this year. It is hoped that teachers will apply these more carefully than has been the case in some centres this year.

Activity c Quantitative measurement

The four tasks set to assess this activity proved to be equally popular. Some centres set ASC3 Sodium thiosulfate-iodine late in the course. This proved to be a consistently high scoring exercise for many. The moderators saw some instances of the award of marks by teachers for answers that did not match those in the mark schemes.

- For the titration calculations in ASC1 and ASC3 answers should be given to 3 or 4 significant figures. A failure to do this should be penalised the first time it happens in a task but not a second or third time.

- In ASC2 and ASC4 marks for enthalpy changes should not be awarded when the candidate is told to include a sign with the value but fails to do so. A positive sign must be written and not just assumed.

- In ASC2(f) a sign and an answer to 2 significant figures is needed for the mark. For example -56 kJ mol^{-1} will score the mark.

- In ASC2 the graph should cover at least half the available width and depth of the paper supplied for the first mark in (a) to be scored.

- In ASC1 and ASC3 burette volumes must be recorded to the nearest 0.05 cm^3 for mark 2 to be scored. Examples of volumes that are to the nearest 0.05 cm^3 are 23.40, 24.85 and 22.00 cm^3. These volumes are not to the nearest 0.05 cm^3: 24.0, 23.63 and 22.5 cm^3.

- As has already been stated it is essential that a candidate's expected values are annotated on the activity c tasks. Only then may the moderator follow the award of marks for accuracy and range. Teacher's values should be included with the sample of work sent to the moderator. These may be given on the Edexcel Teacher's Values Form or on a spread sheet or graph that may have been used to help in the award of accuracy marks.

- Teachers need to be absolutely clear that to gain accuracy marks a candidate's value of titre or temperature must fall within the ranges given in the mark schemes. If necessary the candidate's value may be corrected before accuracy marks are awarded. For example in ASC2 if the candidate has read the volume or temperature incorrectly from his or her graph then the first mark in (c) is not given. The teacher should then read off corrected values before awarding the marks for accuracy of both volume and ΔT.

The four tasks used in the 2008-2009 scheme will again be used in 2009-2010. However some amendments have been made to the marking schemes and the unfortunate errors in the tasks have been corrected.

Activity d Preparation

The three preparations in the scheme proved to be equally popular. All worked to give the desired product. There were reports from centre assessors during the year pointing out that the mass of crystals required for both yield marks to be awarded in ASD1 and ASD2 was unrealistic. For 2009-2010 the yield needed for both marks has been reduced.

Some teachers appeared to mis-understand the marking of yield in ASD1 and ASD2. In both tasks one mark is available for calculating the maximum (or theoretical) mass. There is then one mark for the method of calculating the actual yield. This mark must be awarded consequentially. If the candidate made an error in the calculation of maximum mass this should be carried forward and allowed for in the award of the actual yield method. There are then up to two further marks for the yield. If the candidate has made an error earlier then the teacher should correct this then award the yield marks on the corrected figure. The percentage yield needed for the award of either one or two marks is clearly stated in the mark scheme.

Summary

The moderators thank centre assessors, candidates and technicians for their parts in the implementation of the new specification internal assessment scheme in its first year. **Centres assessors must make absolutely sure that they are using the new and revised assessment tasks in 2009-2010.** They should also act to correct any errors that their moderator may have pointed out on the E9 feedback form or that have become apparent from reading this report.

Centre assessors are encouraged to ask the Principal Moderator for guidance on the scheme through Ask the Expert. They may also consider joining a training event details of which are given on www.edexcel.com/resources/training

Hints for revision

- Record burette volumes to the nearest 0.05 cm^3. eg 23.45 cm^3, 24.60 cm^3.

- When you add an organic liquid to water in a test tube shake the mixture then allow it to settle. Observe the test tube carefully. Layers may have formed or the two liquids may be miscible.

- When you carry out calculations from titration results give your answers to three significant figures.

- When you calculate a value for an enthalpy change, ΔH, include a sign with your answer. If the change is endothermic include a positive sign.

6CH03/1B

General

Candidates taking this externally marked component completed the same practical tasks as those entered for the internally assessed coursework 6CH03/01A. The examiners marking this paper used the same mark schemes as the teachers and moderators marking the internally assessed component. The examiners and moderators were standardised by marking or moderating common samples of the assessment tasks.

There will be no feedback to individual centres so centre assessors are strongly advised to read both this report and that for 6CH03/01A. Much of the information in the 6CH03/01A report is relevant to this component. Teachers should take action to adopt the changes in the scheme for 2009-2010 and address any shortcomings in their implementation of the scheme.

Comments on the administration of the scheme

- The sample of work sent to the examiner for each candidate should have a record sheet attached by a paper clip to the three assessment tasks. Each candidate should have one task for each of activity b, c and d. No extra work should be sent.

- It is vital that the work sent to the examiner is accompanied by a Teacher's Values Form. This must list the values of titre and temperature obtained by the teacher when carrying out activity c tasks ASC1, ASC2, ASC3 and ASC4. If a centre fails to include this form then the examiner is unable to award accuracy marks in these tasks.

- All of the AS assessments will be revised for 2009-2010. **The activity b tasks are new** although very much in the same format as the ones used previously. Minor changes have been made to the c and d tasks. It is therefore, vital, that teachers download the revised tasks from the secure website and use only these for their candidates entering 6CH03/01B in summer, 2010.

- Some centres sent work to the examiner that had already been marked in the centre. The examiners remarked this work, ignoring the annotations already on the scripts.

Activity a (GPC)

The requirement for candidates to complete the core practicals and to have five listed on the record sheet is exactly the same as for the internally assessed Unit 3 option.

- In the specification there are suggestions as to the topics for which a greater knowledge and understanding of the chemistry may be gained by having candidates carry out laboratory work. These are listed as Core Practicals (CPs).

- The choice of experiments within a centre to cover the demands of the specification is left to the teachers in charge of the course. Edexcel does not provide details of core practicals.

- The titles or codes (CP1 etc) of five core practical tasks carried out by a candidate must be listed on his or her record sheet along with dates on which they were carried out. No marks are required for these tasks. The five tasks must include at least one each of an inorganic, physical and organic exercise.

- The examiner does not need any samples of the work or any more details than are on the record sheet for this activity.

- It is acceptable to list as activity a tasks assessment exercises that are not being submitted for examiner marking. However, an exercise must **not** be counted for **both** activity a **and** b, c or d.

Activity b Qualitative observation

The four tasks available in 2008-2009 are no longer valid and must not be used for this activity in 2009-2010. Four replacement tasks are to be found on the secure web site.

There were a number of common incorrect observations that were recorded by candidates. Many of these were made on tests that will feature on the new activity b tasks.

- If a compound or functional group has to be identified by formula then the name will not be accepted for a mark.

- The colours of the silver halide precipitates should be described as white, cream or pale yellow respectively. When the chloride and bromide dissolve in aqueous ammonia a colourless, not clear, solution is formed.

- When a precipitate is formed this should be described by recording both its colour and the word precipitate. The terms “suspension” and “white solution” should be avoided.

- Candidates should be taught that when an organic liquid is mixed with water the expected observation is either that the two are miscible forming a solution or are not miscible and form layers. If they are miscible then this indicates that the organic compound has polar molecules or forms hydrogen bonds with water.

- If two compounds react to form a gas then candidates should record the observation that “effervescence” or “bubbles” are seen. An observation that “hydrogen is given off” when sodium reacts with an alcohol is not acceptable since no test has been carried out on the gas.

- The expected observation when phosphorus (V) chloride reacts with an alcohol or concentrated sulfuric acid reacts with a solid chloride is that “steamy fumes” are observed just inside the mouth of the test tube. It is only if the gas emerging from the tube comes into contact with ammonia that “white smoke” is seen.

Activity c Quantitative measurement

ASC1, ASC3

There were common reasons for the loss of marks on the two titration exercises. Candidates should be aware of the following in an attempt to gain a higher mark for either of these tasks.

- Burette volumes must be recorded to the nearest 0.05 cm^3. Examples of volumes that are to the nearest 0.05 cm^3 are 23.40, 24.85 and 22.00 cm^3. These volumes are not to the nearest 0.05 cm^3: 24.0, 23.63 and 22.5 cm^3.

- Only titres within 0.20 cm^3 of each other should be chosen to calculate the mean.

- The mean titre should be rounded to the nearest 0.05cm^3 although to the second decimal point is acceptable.

- The answers to the calculations in both tasks should be given to three significant figures.

ASC2

To be awarded the mark for choosing "sensible scales" a candidate had to plot a graph such that it used at least half of the grid in two dimensions. The points must be joined by either a smooth curve rising to a maximum or two intersecting straight lines. In this task the only answer for which a specified number of significant figures is demanded is (f). To score the mark in (f) the enthalpy change has to have a sign. For an endothermic change the positive sign should be written.

ASC4

There are three enthalpy changes to be calculated each of which must have a sign written before the value. The answer to the calculation of ΔH^3 must be given to two significant figures. For example +92 kJ mol^{-1}. The errors in the cycle on page 6 have been corrected for the 2009-2010 scheme.

Activity d Preparation

ASD1, ASD2

The two preparations of salt crystals both worked well as assessments giving a range of marks. There was a wide variation in yields and in the description of the crystals. Examiners, of course, are unable to check either the mass of crystals recorded by the candidate or their appearance. Candidates should understand that the answers to parts (a) and (b) in both tasks and (c) in ASD1 should refer to observations made during the preparation. "Human error" was not accepted as a reason for a lower than 100% in either preparation.

ASD3

In (a) it was necessary to state only the final colour on the flask to be awarded the mark. If a candidate described a coloured product in (b) then some of the oxidising mixture from the flask must have carried over and the mark was not awarded. In part (g) the examiners awarded the first mark for a description of a vertical condenser even if the word reflux was not included.

Summary

The examiners thank teachers, technicians and candidates for organising, setting and completing the practical tasks for 6CH03/01B.

Centres must make absolutely sure that they are using the new and revised assessment tasks in 2009-2010. The activity b tasks are new. There are minor changes to the c and d tasks. Teachers should download the tasks from the website making sure that only the new and revised versions are used for their candidates beginning AS in September, 2009.

Hints for revision

- The colours of the silver halide precipitates, AgCl, AgBr, AgI should be described as white, cream and yellow respectively.

- When calculating a mean you should average titres that are within 0.20 cm^3 of each other and round off the mean to the nearest 0.05 cm^3. eg If the calculated mean is 23.43 cm^3 this is rounded to 23.45 cm^3.

- In a thermochemistry experiment using a burette and pipette to measure volumes the least accurate piece of apparatus in use is likely to be the thermometer.

Appendix A: Statistics

6CH03/1A

Grade	Max. Mark	A	B	C	D	E
Raw boundary mark	40	35	31	27	23	20
Uniform boundary mark	60	48	42	36	30	24

6CH03/1B

Grade	Max. Mark	A	B	C	D	E
Raw boundary mark	40	35	31	27	23	20
Uniform boundary mark	60	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

Order Code US021182 Summer 2009

For more information on Edexcel qualifications, please visit www.edexcel.com/quals

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