



General Certificate of Education

Applied Science

8771/8773/8776/8779

SC06 Synthesising Organic Compounds

Report on the Examination

2009 examination - June series

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General Comments

The number of candidates entered for the portfolio units has again increased this year and many centres have continued to guide their candidates to achieve well. These units have generated much high quality work from centres. Credit should be given to both teachers and candidates in making considerable effort to meet the expected standards.

The random sampling of accredited centres confirmed the value of the accreditation process - with centre marking being confirmed as being in line with AQA standards in most cases, but with a small number showing some "slippage" leading to loss of accreditation.

(The accreditation scheme is used where centres have demonstrated that they are able to mark to the required AQA standards. Under the scheme AQA will accept centre marks without the need to complete the moderation process.)

Portfolio issues

Portfolio construction remains a concern with some candidates, and it is evident that further centre guidance is needed. However, it is very important that centres continue to provide the opportunity for candidates to demonstrate flair and individuality. It is easier for moderation if portfolio structure matches the structure of the unit. Centres are also advised to monitor portfolios during their production as some candidates continue to produce unreasonably large portfolios.

For some units, it appears that the level of expectation of the quality of portfolio content and/or the outcomes that candidates are able to produce are set too low. A number of centres are still judged to have marked candidates work too generously and where this was the case, centres marks were deemed out of tolerance by the moderator and had to be reduced.

Some of the causes of overgenerous marking included:

- Misinterpretation of the requirements of unit
- Too much work on non-essential areas and/or too little on required aspects
- failure to fully complete aspects of the unit as required in the "Banner", in such cases work should be assessed in line with the guidance given in section 9.2 of the teachers' guide
- Over-lenient interpretation of the assessment grids
- Lack of rigour in marking/assessment of work – incorrect science accepted, incorrect calculations marked as correct, incorrect statements accepted, praise for work which is of poor quality, marks allocated for work for which there is no evidence – or no supporting teacher comment (# in the assessment grids)
- Poor candidate skills in practical activities leading to a lack of precision and unreliability in results
- A lack of description by the centre assessor of candidate's level of practical skills, their awareness of safety procedures and degree of autonomy (marked # in the assessment grids) and resulting inconsistencies between the marks awarded by the assessor and the portfolio evidence
- The inclusion of materials downloaded from the internet either passed as the candidates own work or not referenced in the portfolio

As stressed at AQA standardising meetings held in autumn 2008, in communications sent to centres and in last year's Principal Moderators report, it is imperative that centres make it very clear to candidates that the incorporation of text downloaded from the Internet into portfolios is plagiarism and must not be tolerated.

Centres are reminded that many issues and points of guidance made in the 2008 Principal Moderators exam report are still valid and this remains a valuable source of information for centres seeking to improve their portfolios.

Unit 6 – Synthesising Organic Compounds

Many good portfolios were seen which met the requirements of the specification. The coverage of the account of organic compounds is improving, although spectroscopy, shapes of compounds and research for synthetic methods are poorer areas; not all candidates ensure that the complete range of functional groups and types of reaction are adequately detailed.

In the experimental section, most (but not all) syntheses are appropriate and allow candidates access to the full range of assessment requirements. Some candidates do not report on the complete purification and melting point or boiling point of the pure product.

The application of a spectroscopic technique to one of the products, including the discussion of the scientific principles and benefits of the use of that technique, remains a weak area and is omitted by far too many candidates. There is a tendency for some candidates to rely very heavily on Internet based material in this unit and centres are advised to adopt a rigorous approach to the correct use of such material.

Good portfolios included the following features:

- A full account of organic compounds covering the functional groups, shapes of organic molecules, isomerism, types of organic reactions as indicated in the specification. Correct structures, formulae and equations, where relevant, to illustrate the points made
- Types of reactions firmly linked to organic compounds with explanations and examples
- The use of mass spectroscopy, infrared spectroscopy and NMR to provide evidence for the purity or nature of organic substances; one of these methods linked specifically to one of the products made by the candidate
- Explicit research for synthetic methods, including the purification techniques, for the two chosen compounds – supported by fully referenced sources
- Careful selection of the two compounds to make is a key decision. One solid and one liquid are required, each capable of being prepared with reasonable yields and to be successfully purified using school based apparatus. For the liquid, a simple ester such as ethyl ethanoate or a liquid alkene such as cyclohexene, are popular choices. Ethanal, ethanol, ethanoic acid, however, present candidates with problems for a variety of reasons. For solids, Aspirin remains a popular choice, although others which provide opportunities for candidates to access all the assessment criteria are also appropriate
- Comprehensive standard procedures and risk assessments are well written and reasoned
- Comprehensive observations and yield data are readily identified
- Extensive data for both preparations and the subsequent determination of melting point and boiling point of the purified product are clearly tabulated and taken to suitable levels of precision with appropriate use of significant figures and units
- A comparison of the experimental and theoretical yields and also actual and standard melting and boiling points

- Calculations which were are well laid out and stages explained clearly producing correct answers of percentage yield for both compounds – identified by teacher comments
- Balanced equations for both preparations, structures of reactants and products and thorough explanations of the types of reactions involved for both products are included
- An evaluation of the yields obtained and the purity of the compounds prepared leading to a discussion of possible modifications to the methods used. - Modifications should be aimed at improving the purity and/or yield of the products. This is difficult area for candidates and a degree of guidance by the centres concerning the types of ideas that need to be discussed and applied would pay dividends. Candidates could consider – for example - alternative or modified methods of preparation, changes to the reaction conditions and alternative or modified methods of purification
- A clear indication of a spectroscopic technique linked to one of the products and evidence of thorough research into the principles behind the chosen technique and the benefits of its use. This will include clear links to the compound chosen with spectra and peak assignments

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA Website.