



General Certificate of Education

Applied Science

8771/8773/8776/8777/8779

SC15 The Role of the Pathology Service

Report on the Examination

2010 examination - June series

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General Comments

The number of candidates entered has again increased this year *for many units* and many centres have continued to guide candidates to achieve well. The award has generated much high quality work from centres. Credit should be given to both teachers and candidates in making every effort to meet the requirements of the award, producing portfolios, many of which demonstrated a commendable standard of content, approach and presentation. The centre accreditation scheme currently numbers 94 centres at AS and 26 centres at A2 level and random sampling of these centres has again confirmed the value of the process – with centre marking being confirmed as in line with AQA standards in the vast majority of cases, but with a small number showing some “slippage” with marks going out of tolerance leading to loss of accreditation.

Portfolio issues

Portfolio construction remains a concern for some candidates, and it is evident that better centre guidance is required in some cases. However, it is very important that centres 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 production to identify “cut and paste” styles of working early and to ensure approaches are appropriate. Some centres correctly down-marked candidates’ final portfolio marks due to inappropriately including cut and paste or copied work – but early identification and correction of such work could have avoided these final mark reductions. Other centres missed the inclusion of un-reworded downloads and these were dealt with appropriately by moderators, with most instances resulting in portfolio marks falling out of tolerance, a situation which unfortunately affects the entire entry for that unit. It is essential that these situations are dealt with at centre level before submission of marks in order that all candidates are treated fairly.

Some candidates continue to produce unreasonably large portfolios and it is rare for such portfolios not to include irrelevant material or be repetitive or, indeed, to have omitted some areas that would benefit from additional time and consideration.

For some units, it appears that the levels of expectation of the quality of portfolio content and/or the outcomes that candidates are allowed 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, marks were reduced and fell out of tolerance.

Some of the causes of over-generous 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 fundamental aspects of the unit as required in the “Banner”
- Over-lenient interpretation of the assessment grids
- Failure to appreciate that high scores are likely to equate to “A” grade which means very good work in all areas of a unit – marks allocated to students should be matched to the track record and overall ability of students to ensure they are justified. Weak students gaining uncharacteristically high grades could indicate lenient marking.
- 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).

- The inclusion of materials directly down-loaded from the internet – such work should be awarded NO MARKS as original student work.
- Weak candidate skills in practical activities leading to a lack of precision and unreliability as evidenced in results, but high marks awarded.
- A lack of description by the centre assessor of each 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 and the portfolio evidence.
- Many units require the use of risk assessments, and whilst many candidates include these, centre assessors are frequently over-generous in their allocation of marks in this area. The following are examples of where candidates are insufficiently accurate or specific and where marking is lenient.
 - Where solutions are used, the concentration is important and this can significantly affect the hazard and subsequent risk factors.
 - Where compounds or solutions are used, it is inappropriate simply to refer to and use the elemental form of the cation component of a compound – sodium has quite a different hazard rating to sodium chloride!
 - Common sense and an understanding of science should be applied when judging risk. Candidates should consider what are the real and sensible hazards and risks and then relate these to the actual compounds used at the concentrations involved as appropriate.

2010 was the first year for Quality of Written Communication (QWC) to feature in all portfolio units. The criteria appear in AO1 of Sc01 and AO3(ii) for all other units. Whilst appearing in particular assessment objectives, the intention is for the QWC statements to be applied across the entire portfolio. As explained at teacher standardising meetings, the intention was that QWC would consist of a cluster of criteria within each mark band and would generally be in line with other criteria at the level in question. As such there would be little change to existing standards. This has proved to be the case and only in a minority of instances did marks move up or down due to QWC alone. It was generally clear that centres had taken into consideration the QWC elements in their assessments. Unfortunately a minority of centres have continued to use the older criteria where QWC statements are not included and all centres are advised that they should be using the correct assessment grids.

Centres are reminded that many issues and points of guidance made in the 2008 and 2009 examination reports are still valid and these remain valuable sources of information.

SC15

The term pathology in this unit is made in reference to the pathology departments found in hospitals and the unit refers to clinical pathology. In different hospitals, the exact terminology used to describe departments may vary but the unit requires study of 4 areas of the hospital medical service in detail:

- The biochemistry department
- The haematology department
- The microbiology department
- The histopathology department.

In addition the knowledge and skills of those working in the biochemistry and microbiology department should be explained.

Good portfolios include the following work:

- 1) a) Details of the type of specimens that are received by each department.
b) An explanation of the tracking procedure of samples to ensure that errors are not made in matching test results to samples and that the results are returned to the correct source.
c) Essential details of the types of tests carried out on samples – taking into account the fact that much work is now automated in some departments. The principles of tests and the procedures of automated testing were still well explained.
d) An explanation of Elisa and Grams staining techniques .
These areas allowing access to marks in AO1 and AO2.- if done well, at mark band 3 and above.
- 2) An explanation of the roles and qualifications of personnel working in the biochemistry and microbiology departments. If missing, this restricts marks in AO1 to zero **for this aspect** but if explained well can give access to marks in mark band 3 or above.
- 3) An explanation of the implications of the Data Protection act .
- 4) Details of health and safety principles and their importance to the specific work of each department. This allows access to marks in each mark band. Candidates gaining high marks will clearly identify specific health and safety issues in each department and also link this to the appropriate legislation from which they derive, allowing access to marks from mark bands 3 and 4.
- 5) An overall account for the clinical pathology department as a whole, with specific references being made when considering separate departments.
- 6) Practical activities using microbiological **and** either chromatographic or electrophoresis techniques **and** the comparison of these with hospital laboratory techniques **and** the impact on outcomes allows candidate access to marks from AO3. It should be noted that this work could contribute up to 40 of the 60 marks available for the unit. Candidates should appreciate that the report of the work of the pathology department is important and worth up to 1/3 of the unit marks but that the practical activities - if undertaken well - can contribute the other 2/3 of their marks and so high quality practical work and subsequent analysis is a very important part of the unit.
- 7) Clear evidence of a chromatographic or electrophoresis analysis, demonstrating - through the descriptions and results – that candidates had **carried out** and understood the experimental work. In some work it is very difficult to decide whether the content is a student's own work, exemplar work from the internet, a combination of the two or joint working from a whole group or class. Under these circumstances moderators find difficulty in confirming mark allocations. It should be clear that work is that of the candidate and is original – or, if not, which aspect is.

The microbiological analysis frequently involves the use of bacterial lawns and the measurement of zones of inhibition resulting from antibiotic or antiseptic treatment. There is a need for greater accuracy in some of this work where zones of inhibition should be determined based on measurements of more than one diameter to increase reliability of results.

There should be sensible consideration of the requirements in AO3(ii) to compare the **same procedure** used in school and the hospital environment and the implications of any differences on the outcomes of the work. Some candidates did this well describing both manual and automatic procedures. Many compare procedures but omit the work on the impact on outcomes of test results thus restricting access to some marks right across the mark bands. Candidates gaining higher marks from mark bands 3 and 4 for this aspect will explain differences and also why these differences may affect results.

Frequent omissions were the organisational structure of departments linked to the role and the qualifications of personnel, the tracking and disposal of specimens and relevant Health and Safety legislation. Candidates need to consider how they structure their portfolios for this work. Some provide a general account of hospital procedures for Health and Safety, tracking of specimens and their analysis and disposal and then include specific details for each department. Others repeated exactly the same material in each section of their portfolios with additions as appropriate. It seems sensible for candidates to provide a general account overall and then explain how this differs for each department as it is considered rather than keep repeating the same material in different parts of the portfolio.

Almost every candidate carried out the two analyses but a wide range of levels of skill and capability was demonstrated. The work included ranged from the chromatography of inks (which is inappropriate at A2 level in this unit) to detailed electrophoresis of DNA which had been extracted by candidates. Many used microbiological analysis very similar to the work submitted for Unit 12. Ideally candidates should not simply repeat work from Sc12 or simply copy their results across. Since candidates need to know about Grams staining technique in this unit, it would be possible to use this technique for the identification of non-pathogenic microbes in **an appropriate investigation**. Simply using the technique alone for no particular purpose is not an analysis. The use of class results where one candidate contributes very little to the overall outcome also compromises the award of marks in the higher mark bands of AO3 where skills and autonomy of working are a requirement.

There is a tendency in this unit for some candidates to rely heavily on internet sources and they should be reminded of the consequences of including such work which has not been reworded. Even if referenced and acknowledged, direct downloads or text where modifications from the original are minimal must not be given credit. Ideally portfolios with such work included should be returned for re-working and this highlights the need for interim inspection of portfolios. Once final submission dates are reached, reworking of what is perceived to be a completed portfolio is demoralising, daunting and possibly unreasonable. Major issues should have been identified early and corrected – provided the candidate is prepared to take guidance and make the effort and has submitted work as required for early monitoring.

Mark Ranges and Award of Grades

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