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Examiners' Report/ Principal Examiner Feedback

Summer 2010

IGCSE

IGCSE Chemistry Coursework (4335) Paper 04

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Report On The Coursework Component – 4335 / 04

The total numbers of centres entering candidates in summer 2010 for the coursework component of the examinations were:

4335 – Chemistry – 8 centres

The moderating instrument used was the Sc1 criteria previously used by home centres, using exemplars provided by the JCQ (Joint Council for Qualifications) as a guide.

Generally the work seen was of grade C or higher standard, with very few grade G candidates. The marks awarded by the centres for investigations for the separate sciences tended to be high and a number of very high marks were seen in the samples and the average mark for the centres' assessments was in the mid-twenties. The marks awarded by the centres for investigations for the separate sciences ranged from 13 to full marks of 30.
For centres entering students for the Double Award Science, the mark range was again high, ranging from the low 20's to 60 marks.
The marks were almost always confined to a single investigation for the separate sciences (two could have been used) and mainly just two for the Double Award Science entries when a maximum of four investigations is possible.
Centres are reminded that students should work individually, with minimal teacher guidance, on the investigations presented for moderation. For this reason, one would not expect to see virtually identical scripts with identical safety issues, the same preliminary task with the same number and range of readings, the same task with the same results, and the same improvements suggested.

Skill Area P: Planning

Comprehensive and detailed scientific information was often written but it was not always used sufficiently to support predictions and inform plans. Students did not always consider the control and monitoring of all relevant factors when they were planning how to obtain reliable evidence as often no plan was made to control or monitor the ambient temperature during the course of the investigation even though candidates had stated it was a variable to consider. As a consequence, it was not always possible to support the award of P.8a. Most students carried out some form of preliminary work involving the establishment of the range to be investigated, but on occasions some other factor was investigated, such as a suitable time duration for the osmosis practical. Students did not always appreciate that in order to satisfy P.8b they should show how this preliminary work informed the main investigation that they were going to perform.
Centres are reminded that to fully achieve P8b, students need to clearly show how the preliminary work has affected their planning for the main task. It is not necessary to carry out the entire task as a trial run – only two values of the range chosen (normally the extremes of the range) are required, in order to see if the range chosen is appropriate.
The moderators were pleased to see some sensible and appropriate preliminary work being carried out which aided the planning of the main investigation and was usually correctly given credit by the award of P.8b.

Skill Area O: Obtaining Evidence

Many of the centres and their students failed to recognise that taking averages of results where there are significant variations, does not give reliable evidence. Very rarely did students identify these anomalies and then repeat the measurements so that they could ignore rogue results when calculating averages. Occasionally students averaged the readings for individual components (such as voltage and current) for a particular length before carrying out a calculation to determine the variable linked to the investigation (i.e. resistance). If the values of the item being averaged showed significant variations, then the reliability of the evidence is compromised. Some students did not appreciate the need to control and monitor significant variables. The obvious one being the ambient temperature at which the investigation was carried out. For these reasons, it was not always possible to support the centre's award of eight marks for this Skill Area. However, most students were able to justify the award of at least six marks by the systematic and accurate means they had collected and presented their evidence.

Skill Area A: Analysing and Considering Evidence

Most students were able to carry out the required calculation for the factor under investigation, i.e. percentage change in mass of potato stick, rate of chemical reaction and resistance of a wire, and then use this information to draw the graph of the evidence, with a line of best fit in the form of the expected straight or curved line, thus achieving A.6a. Detailed scientific knowledge was often used to discuss the evidence to produce a valid conclusion, but this evidence was not always the processed evidence shown by the graph. Sometimes the data in the table of results made the award of A.8a problematical. It was good to see discussions that often considered the shape or angle of the graph in order to determine the exact relationship between the variables investigated. Students still find it difficult to discuss the prediction in terms of the processed evidence displayed in the graph and often ignored the tentative nature of any relationship displayed by the scattering of plotted points around the line of best fit, making the award of A.8b difficult to justify.
When awarding A6b, teachers need to bear in mind that the specification requirements are that the students should explain the science behind the results they have obtained. Merely describing the shape of the graph does not result in the student achieving A6b.

Skill Area E: Evaluating

Most students were able to identify anomalous results and make some comment on the quality of the evidence obtained and so satisfy E.4a. Discussion of the procedure and identification of possible improvements was surprisingly weak in some cases, although E.4b had usually been awarded. Most students understood that any further work suggested had to be described in some detail and justified in terms of the original task, either by extending the range investigated or by investigating a linked factor for E.6b to be awarded. However, discussion of the reliability of the evidence obtained and, in particular, explaining the cause of identified anomalies, was not always easily accomplished, yet E.6a seemed to be freely awarded in a number of cases.
For E4b, students are required to suggest at least one meaningful improvement to the technique used – and give some indication as to why the improvement(s) proposed would result in the obtaining of more accurate data. It was very rare to see 6 marks awarded in skill E, mainly because students were generally unable to discuss the reliability of the evidence, although they could usually come up with an explanation for anomalies in their evidence (E.6a).
Some good suggestions for further work to provide additional relevant evidence with good descriptions were seen (E.6b), but there were still examples of students being given credit for simple statements of what they might do next, which is not worthy of full marks.

Internal standardisation:
At most centres it was good to see that there was clear evidence that internal standardisation had been scrupulously carried out, and there appeared to be consistency in assessment across the various groups in a large entry. There remain some centres which do not appear to have carried out any form of internal standardisation, however.

Annotation:
The quality of annotation was variable, with some centres not annotating the students' work at all. Teachers are respectfully reminded that when scripts are marked, teachers should use the printed coursework mark criteria as a guide, putting minimalist annotation such as P6b, P8a, and P8b alongside the point in the script where the student achieves the mark description. Some centres were very conscientious in the annotating of their students' work, often providing detailed, constructive and relevant comments about the matching of the mark descriptors in each Skill Area.

Chemistry 4335

The most common task seen this year was once again a rates task – varying concentration in the sodium thiosulphate / hydrochloric acid reaction. Marble / acid, and magnesium / acid were seen as alternative rates tasks.

The thiosulphate / hydrochloric acid rates task was a very common task in UK centres, but it does have some disadvantages. Firstly, if the students (or teacher) decide to investigate the effect of varying the concentration of sodium thiosulphate solution, it is difficult for the students to incorporate sufficient scientific knowledge to fully access P8a. It is more appropriate to study temperature as the variable, so that students can discuss exo- and endothermic steps, as well as the concept of activation energy.
Centres which awarded full marks for the visual disappearance of a cross in the thiosulphate/acid task were too generous. The observation of a cross disappearing as the precipitate of sulphur forms, is a subjective matter and therefore it lacks **precision**. (Precision is a key factor in the award of O8a). For this investigation a ceiling of 7 marks in skill O is normally applied during moderation because of the subjective nature of the time for the cross to disappear.
Please note also that the requirements of O6a and O6b should be fully met before O8a is considered.

Students who choose to investigate the effect of varying temperature on the reaction rate, should be encouraged to record the actual temperatures used. Quoting temperatures to the nearest ten degrees (perhaps following the range of temperatures stated in the planning phase) lacks precision. We would hope to see temperatures measured, and recorded, to the nearest degree.

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