



General Certificate of Secondary Education

Chemistry 4421

CHY3F Unit Chemistry 3

Report on the Examination

2011 examination – June series

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Chemistry
Foundation Tier CHY3F**General**

This report should be read in conjunction with the published Mark Scheme.

The mark scheme was flexible enough to allow candidates to express their answers in a variety of ways and still gain marks.

However, the following questions proved particularly difficult for over 70% of candidates:

Question 5(d)(i) – why people should be concerned about the claim that Valley Croft spring water ‘contains no chemicals’; Question 6(b)(i) – an instrumental method of analysis for the detection of iron; Question 6(b)(ii) – why an instrumental method would detect the iron in the sample of Muntz metal but a chemical method is not likely to be successful.

Other questions that were poorly answered by at least 60% of the candidates were: Question 3(b) – meaning of the word ‘strong’ in connection with an acid; Question 5(a)(i) – using information from the labels to explain why Mountain View spring water is about three times as hard as Valley Croft spring water; Question 5(a)(ii) – using soap solution to show that Mountain View spring water is about three times as hard as Valley Croft spring water.

Many of the questions that were less well answered tended to be those that involved recalling specific knowledge, and those that required explanation and the use of specific scientific terms. Candidates do need to make the effort to learn the factual material given in the Specification.

Questions 5 and 6 were standard demand questions and were common with Questions 1 and 2 on the Chemistry Higher Tier Paper (CHY3H).

Question 1 (Low demand)

All parts of this question were very well attempted by the vast majority of candidates.

Question 2 (Low demand)

- (a) Just under a half of the candidates did not score this mark.
- (b) (i) Almost two-thirds of the candidates were able to correctly identify ‘B’ as the activation energy.
- (b) (ii) Just under a half of candidates identified ‘A’ as the correct answer.
- (b) (iii) At least half of the candidates scored both marks.
- (c) (i) This was quite well attempted but quite a few candidates just wrote ‘to mix it’, missing out ‘properly’ or ‘well’ while some gave the answer ‘to dissolve it’.
- (c) (ii) This was very well attempted.

Question 3 (Low demand)

- (a) In part (a) (i) and (ii) a minority of the candidates found these questions difficult and scored no marks at all.
- (b) This was quite poorly attempted with a large number of candidates giving the answer as ‘very concentrated’.
- (c) In part (c) (i) and (ii) a large number of candidates were able to score marks here.

- (d) A quarter of the candidates did not score the mark in part (d)(i). Quite a few candidates made reference to the results table that was given in the question and wrote 'when the volume stayed the same'. (d) (ii) and (iii) were quite well attempted.

Question 4 (Low demand)

- (a) A large number of candidates were able to score the marks here.
- (b) (i) This was very well attempted.
- (b) (ii) Around a third of the candidates were unable to work out 'B' as the fuel that releases the most heat per penny.
- (b) (iii) The vast majority of the candidates scored the mark here but some candidates attempted to write the formula of carbon dioxide and got it wrong as they wrote CO_2

Question 5 (Standard demand)

Some parts of this question were very poorly attempted.

- (a) (i) Very few candidates scored both marks and a minority scored one mark. Around two-thirds scored no marks. Some compared the total amount of all the ions in the two types of water; others simply re-stated the information given in the stem of the question while some thought that it was the sulfate ion that caused the hardness as they divided 21 by 7 and got 3.
- (a) (ii) This was very poorly attempted. Very few candidates achieved all 3 marks and only a minority gained two marks. Just over a half of candidates scored nothing. The vast majority of candidates lost the first mark as the answers given were 'add', 'react', 'rub' or 'use' without any idea of 'agitation'. For the second mark, many candidates simply stated that more scum would be formed without being quantitative. Other answers included 'it would take 3 times longer'; 'it would take much more water to lather' and '3 times more lather would be produced'. The vast majority of the candidates did not gain the 'fair test' mark as they invariably contradicted the correct answer by saying 'the same volume of soap'. Many weaker candidates talked in terms of 'washing hands' or 'washing clothes' and 'repeating the test 3 times'.
- (b) This was very well answered by the large majority of the candidates. Some just wrote 'it contains essential minerals' while a few thought that the 'chloride' and 'hydrogen carbonate' were very important.
- (c) A half of the candidates did not score this mark. There was great confusion between 'scale' and 'scum' with candidates stating 'scum formed in kettles and in pipes'. Some simply wrote 'hard water blocks pipes'.
- (d) (i) This was very poorly attempted. Almost 70% of the candidates did not gain this mark. The vast majority of candidates thought that 'if there were no chemicals, then the water would not be clean as it would still contain bacteria'. Others said that the company was biased.

- (d) (ii) This was quite well attempted.

Question 6 (Standard demand)

- (a) Parts (a) (i) and (ii) were very well attempted by the vast majority of candidates.
- (b) (i) This was very poorly attempted. Very few of the candidates gained this mark. Incorrect responses included 'electrolysis', 'titration', 'flame test', 'ultrasound', 'chromatography' and incorrect types of spectroscopy. A large majority of candidates mentioned 'using a magnet' because the sample contained iron.
- (b) (ii) This was also very poorly attempted. Just under three quarters of the candidates did not score this mark. Many candidates wrote 'it is more accurate' instead of 'precise' or repeated the question by saying 'it contains a very small amount of iron'. Others tried to answer in terms of the chemical method not likely to be successful and lost the mark by saying that 'iron is not reactive enough'; 'it would destroy the iron'; 'Muntz metal is an alloy' and 'iron is magnetic'.
- (c) Half of the candidates gained one mark. A large number of candidates gave answers in terms of 'density', 'melting point', 'rusting' or 'durability'. Some candidates talked in terms of properties of steel instead of transition metals.

Mark Ranges and Award of Grades

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