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General Certificate of Secondary Education

Chemistry 4421

CHY3F Unit Chemistry 3

Report on the Examination

2010 examination – January series

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Chemistry
Foundation Tier CHY3F

General

The standard of responses was a lot higher than last year in all respects. The vast majority of scripts were also concise and very legible.

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

Question 5(a)(i), one of the active chemicals in many water filters; question 8(a) the ion that makes solutions alkaline; question 8(b), the meaning of the word strong in terms of ionisation.

Other questions that were poorly answered by half of the candidates were: question 3(d)(ii), the energy change that shows the reaction is endothermic; question 4(a)(i), the colour of the flame given by sodium ions; question 8(c), the test and results to show that sodium hydroxide is a stronger alkali than ammonia solution.

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 6, 7 and 8 were standard demand questions and were common with questions 1, 2 and 3 on the Chemistry Higher Tier Paper.

Question 1 *(Low demand)*

Generally, this question was quite well attempted.

(a) The main problem which candidates encountered was in the identification of the alkali metal.

(b) (i) A very well answered question, with nearly all of the candidates able to give the evidence for sodium having a low melting point.

(b) (ii) Almost three-quarters of the candidates knew that sodium must be soft as it can be cut easily.

(b) (iii) Quite a few candidates named a gas eg hydrogen or carbon dioxide instead of giving evidence.

Question 2 *(Low demand)*

This was another quite well attempted question.

(a) Most candidates were able to select the correct answer.

(b) Incorrect answers included, from the reading on the burette, there will be no fizzing and there will be no more change.

(c) (i) Quite a few candidates added the three readings and got the answer as 55.2. Others worked out the average in this part and some wrote down the answer as 2 instead of 0.2.

(c) (ii) The majority of the candidates were able to work out the mean correctly.

(c) (iii) Quite a few candidates wrote so that it is a fair test while others wrote to get correct results, which did not gain credit.

Question 3 *(Low demand)*

(a) Some candidates wrote in terms of energy or activation energy while others put down water or carbon dioxide.

(b) While a majority of the candidates got oxygen correct, many different things appeared as the product eg lightening, sound, energy, water and nitrate oxide

(c) Two thirds of the candidates realised that in an endothermic reaction more energy is needed to break existing bonds than is released when new bonds form.

(d) (i) Most of the candidates were able to identify 'A' as the activation energy.

(d) (ii) This seemed to be a major problem for about half of the candidates. They could not correctly identify the energy change which shows the reaction is endothermic.

Question 4 *(Low demand)*

(a) (i) More than half of the candidates got this wrong. They could not identify the correct colour of the flame given by the sodium ion.

(a) (ii) Almost half of the candidates were unable to identify the correct colour of the flame given by the potassium ion.

(a) (iii) A large majority of candidates gained a mark here as they were able to recall the fact that the wire used in a flame test should have a high melting point.

(b) (i) Many candidates could not recall the test for the sulfate ion.

(b) (ii) While most of the candidates gained some credit, about a third gained both marks.

Question 5 *(Low demand)*

(a) (i) A large majority of candidates were unable to correctly identify carbon as the active chemical in many water filters.

(a) (ii) This was another well answered question, with a good majority of the candidates knowing that calcium ions cause hardness in water.

(b) Almost half of the candidates gained no marks here. A large number of candidates wrote boiling the water or add lime water. Other incorrect answers were litmus paper, flame test and the universal indicator.

(c) Surprisingly, none of the candidates scored both marks. Only just over half of the candidates gained one mark, this was usually for suggesting that drinking hard water was good for health or made bones or teeth stronger. The majority of the candidates gave the vague answer it provides calcium instead of giving the actual benefit of drinking hard water.

Question 6 *(Standard demand)*

(a) Almost half of the candidates could not draw a smooth curve. Many joined the points with straight lines of drew multiple lines. There were some curves that did not touch the points at all.

(b) A lot of candidates multiplied their answer by 1000. Others misread the scale and did not realize that, on the vertical axis, each square represented 0.2g. Therefore, 5.6 was read as 5.3 and so on.

(c) Many candidates were able to gain one mark for 10 or 2.4 but they were unable to process the data to get the second mark. Some just added or multiplied the two numbers together.

Question 7 *(Standard demand)*

Generally, this question was quite well attempted

(a) The majority of the candidates gained this mark. Some candidates gave vague answers such as cleans the water or makes it safe.

(b) Nearly all of the candidates gained some credit for explaining why the amount of chlorine in swimming pool water should be monitored and controlled, and almost two thirds of them gained full credit. Quite a few candidates lost marks here by giving answers such as too little would not clean the water properly or it would be unsafe.

(c) This was very well attempted and majority of the candidates gained the mark here as they were able to pick out ‘cheap and easy to use’ from the passage.

(d) (i) A large number of candidates wrote because the party wants to win the election or everyone needs to be aware of the dangers of chlorine.

(d) (ii) This was another very well answered question. Most candidates were able to make valid suggestions as to why a well-respected scientist might change the outcome of any discussion.

(d) (iii) Not quite so well answered as 7(d)(ii) but still over two thirds of the candidates gained credit for suggesting that evidence is reliable, factual or accurate, while hearsay is none of these.

Question 8 *(Standard demand)*

The majority of the candidates found this question very difficult.

(a) This was very poorly attempted. All sorts of ions appeared eg H, Na, OH^+, OH and hydrogen.

(b) The majority of the candidates were unable to gain the mark here. Quite a few candidates wrote in terms of dilution. Others wrote ionises more quickly, ionises well, high pH and more reactive which did not gain credit.

(c) This was also quite poorly attempted. A large number of candidates wrote see how quickly grease is cleaned. Many gave their answer in terms of titration or litmus. Others wrote in terms of rate of reaction with a metal while quite a few wrote sodium is higher up in the reactivity series.

Mark Ranges and Award of Grades
Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.