



General Certificate of Secondary Education

**Additional Science 4463 /
Chemistry 4421**

CHY2F Unit Chemistry 2

Report on the Examination

2010 examination – January series

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Additional Science / Chemistry
Foundation Tier CHY2F**General**

The candidates appeared to have sufficient time to answer the paper and the majority of the candidates were able to make a good attempt at almost all of the questions. Some excellent papers were seen.

Question 1

The question gave a friendly start to the paper. Almost all of the candidates gained at least one of the two marks. A few candidates ticked only one statement.

Question 2

- (a) The vast majority of the candidates correctly identified, fertilisers, as the correct
- (b) The question was less well answered with crude oil being a popular distracter.
- (c) (i) Most candidates showed that they understood a word equation. A few candidates introduced substances such as carbon or carbon dioxide.
- (c) (ii) The idea of a catalyst speeding up the reaction was generally well known. Incorrect responses often confused rate of reaction with time giving answers such as the catalyst will increase the time for the reaction. Other candidates thought that a catalyst provides heat for the reaction.
- (d) The majority of the candidates correctly identified the reaction as being reversible.
- (e) (i) The pH scale was less well known, many candidates gave 4 or 7.
- (e) (ii) The name of the acid, sulfuric, was better known than the product of the reaction of hydrogen ions and hydroxide ions.

Question 3

- (a) Both parts of the question were answered well.
- (b) The majority of the candidates understood that molecule A would be heavier than molecule B. The second part proved difficult for many of the candidates and was a good discriminator. The most common correct answers usually referred to greater nuclear mass, atomic mass or mass number. Only a few of the candidates mentioned neutrons. Misconceptions included ideas such as the hydrogen atoms having greater atomic numbers or the molecules containing more hydrogen atoms.

Question 4

- (a) This was very well answered.
- (b) Generally well answered although a significant number of candidates opted for two bonds in part (b)(i) and ionic bonding in part (b)(ii).

Question 5

- (a) Foundation Tier candidates have often struggled with calculations. This question was an attempt to make this type of calculation more accessible to these candidates. About half of the candidates were able to correctly complete both halves of the question. A significant number of candidates chose 16 for part (a)(i) and 1 for part (a)(ii).
- (b) More than half of the candidates were able to gain both marks. A minority of candidates were confused and referred to gases evolved. Some answers were vague and lacked detail giving descriptions of temperature changes. The vast majority of candidates gained at least one mark. A significant number did not read the instruction and ticked only one box instead of two.

Question 6

- (a) (i) A lot of confused answers were seen, which referred to increased heat or energy or the idea that the kiln was a catalyst. Creditworthy answers discussed the mixing or the idea of heat being spread throughout the reaction mixture and not being concentrated in one place.
- (a) (ii) Generally well answered with the majority of candidates gaining one or two marks and a significant number gaining all three.
- (b) Most candidates correctly identified the particles as electrons although a significant number chose neutrons.
- (c) Both distracters attracted significant numbers of candidates.

Question 7

- (a) It is pleasing to note that the majority of the candidates were able to correctly complete the electronic structure of the chlorine atom. A number were penalised because it was unclear whether they had crossed out erroneous electrons.
- (b) A good number of the candidates were able to make a good attempt at this question, which is a topic they have often found difficult in the past. Some excellent detailed answers were seen which mentioned full outer shells of electrons and ideas such as ions are atoms where the number of protons and electrons are unbalanced. Poor answers included ideas such as transfer of atoms, ions or neutrons. Better answers mentioned electrons but many candidates discussed sharing of electrons or the chlorine atom giving the sodium atom electrons. Others candidates hedged their bets and

discussed the sodium losing and gaining electrons. Some thought that the sodium atom would gain a proton.

- (c) (i) Generally well answered.
- (c) (ii) Hydrogen was less well known. Many candidates made guesses and gave answers such as sodium chloride or a wide variety of chemical elements.
- (d) (i) Nearly all candidates gained credit.
- (d) (ii) A number of the candidates missed the point and gave answers such as chlorine is needed to treat drinking water.
- (d) (iii) A fair number of the candidates correctly used their knowledge of How Science Works and gave answers linked to the independent scientists not being biased. Answers to do with accuracy or fair test were ignored since they did not answer this question.

Question 8

- (a) The candidates were expected to use the equation and to identify that hydrogen chloride is a gas. About a third of the candidates gave the correct answer. The word property did not seem to be understood by a number of the candidates who simply gave the names of common gases or chemicals that were in the equation.
- (b and c) The separation techniques in these parts have been asked in several recent papers but remain poorly answered questions. Guesses such as distillation or electrolysis were common and many answers discussed the dissolving process at length. We did not accept sieving in part (b).
- (d) This produced a good spread of marks with the majority of candidates gaining one or two marks and a sizeable number gaining three or four. A number of candidates lost marks because they did not read the question carefully and only gave half the answer. Some only stated the problem and did not explain how it was turned to profit. Others failed to state what the problem was but did go on to explain how hydrogen chloride or calcium sulfide was used to make a profit. Some candidates ignored the information in the passage and waffled about the general problems of industrial processes.

Mark Ranges and Award of Grades

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