edexcel

Examiners' Report/
Principal Examiner Feedback

January 2012

International GCSE Chemistry (4CH0)
Paper 2C

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our qualifications website at www.edexcel.com. For information about our BTEC qualifications, please call 0844 576 0026, or visit our website at www.btec.co.uk.

If you have any subject specific questions about this specification that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

Alternatively, you can speak directly to a subject specialist at Pearson about Edexcel qualifications on our dedicated Science telephone line: 0844 576 0037

Pearson: helping people progress, everywhere
Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2012
Publications Code UG030255

International GCSE Chemistry 4CH0 2C Report - January 2012

Question 1

The vast majority scored full marks in (a). Very few mistakes were seen in (b)(i), with 3 being the most common incorrect answer given for the number of neutrons. In (b)(ii), almost all candidates knew that isotopes had the same proton/atomic number and different mass/neutron number, but many lost a mark as they failed to use the word atoms in their answer. It is important to recognise that isotopes are atoms of the same element and only the better candidates stated this. The answer in (c) was correctly calculated by the majority, although sometimes the final answer was not correctly given to 2 decimal places.

Question 2

Most scored full marks in both (a) and (b). The most common mistakes were to think that E reacts violently with water and that the elements in the Periodic Table are arranged in order of their relative atomic mass, rather than atomic number.

Question 3

The majority of candidates gave a correct answer to (a)(i), with the most common answers being sulfuric acid, sodium sulfate and copper sulfate. A common mistake was to suggest using barium sulphate, but these candidates often redeemed themselves in (a)(ii) by giving a correct equation. In general, (a)(ii) was not so well answered. Where sodium sulfate was used many candidates thought its formula was $NaSO_4$. Candidates need to be aware that no marks can be awarded to an equation that contains an incorrect formula, hence balancing should not be attempted until all formulae have been correctly stated. Where sulfuric acid was used the most common mistakes were a failure to balance the equation; or to give the products as H_2O and NO_2 instead of HNO_3. Dilute nitric acid will not decompose at room temperature during the course of a reaction such as this. Part (a)(iii) was answered well by the better candidates, who gave concise and clear details. The most common omission was the washing of the filtrate. Some failed to gain the last mark by not stating how the solid would be dried e.g. in a warm oven or using filter papers. Far too many candidates gave a lot of unnecessary information about mixing the solutions and heating, etc., before mentioning filtration. In other cases it was unclear whether the description was directed at the residue or the filtrate. Some obviously confused this reaction with the preparation of a soluble salt and discussed evaporating the solution to the point of crystallisation. In these situations the only mark available was the first, for filtering. Part (b) was not answered as well as expected indicating that perhaps a number of candidates had not observed the reaction between a metal carbonate and a dilute acid. The examiners hoped that, even if this were the case, candidates would be able to work out that fizzing would be observed since a gas is produced in a reaction taking place in aqueous solution. Also, it should be obvious that the solid carbonate will gradually disappear since the state sign changes from (s) for $PbCO_3$ to (aq) for $Pb(NO_3)_2$.

Question 4

In (a)(i), many candidates knew that the lid was lifted to allow oxygen to enter the crucible, but there were too many vague answers such as 'to see if the magnesium was reacting'. A few of the weaker candidates thought that it was to let gas/oxygen/carbon dioxide out, or to release pressure or even to let heat escape! Many candidates appeared to have an automatic response to the word 'repeat' and gave answers such as 'to increase accuracy' or 'to obtain an average' in (ii). Very few considered the required outcome of the experiment and hence failed to recognise that it was necessary to make sure that the magnesium had completely reacted. Part (b) was extremely poorly answered. Perhaps it was unfortunate that the question appeared on a different page to the description of the experiment, since a number of candidates failed to refer to the readings that were actually taken and, instead, focused on the table of results in (c). Candidates need reassuring that they will never be required to use information supplied later in a question to answer an earlier part of the question. Part (c) was generally well answered with many candidates scoring full marks. A common error was to join the points rather than drawing a best fit line. Some candidates lost marks due to careless plotting or misreading the numbers, e.g. 1.40 instead of 1.04. The majority could identify the anomalous point and find the mass of magnesium oxide in (c)(iii).

Question 5

The test for chlorine in (a)(i) was generally well known. Some candidates lost a mark by stating that blue litmus turned red and then failed to state that it is subsequently bleached. Others described the test for chloride ions or for carbon dioxide or hydrogen, but fortunately these errors were rare. Most were then able to identify hydrogen as the other gas produced in this electrolysis but, very strangely, sodium was often quoted. The examiners expect all candidates to at least have seen sodium and hence remember that it is a solid. Part (b) was mostly well answered in terms of either sodium hydroxide or hydroxide ions being formed or more simply that the solution was alkaline. Some candidates presumably confused phenolphthalein with litmus and reached the conclusion that the solution was acidic. The majority of candidates scored full marks in (c), although some failed to calculate the number of moles correctly in (c)(i), but scored consequentially in (c)(ii). The usual errors of dividing, instead of multiplying, by 24 or 24000 were seen, and some lost a mark for giving incorrect units, most noticeably those who multiplied by 24000 and then gave units of dm^3. Units of mol/dm^3 were also seen.

Question 6

Surprisingly fewer candidates than expected were aware of the precipitate that was formed in this reaction in (a). This gave the impression that many candidates are learning the tests by rote and not appreciating the chemistry involved. $CuSO_4$ and Na_2SO_4 were seen far too often. Some candidates unfortunately gave a name instead of the required formula. Others gave a full equation but did not then identify $Cu(OH)_2$ as the precipitate. Part (b) proved to be a good discriminator for one mark. Many stated that the acid was added to simply 'acidify' the solution or to 'lower its pH' or to 'make the reaction work'. Again, students seem to be simply committing the details of these tests to memory without having any understanding of the chemistry involved. Many correct answers seen in (c), but many candidates appeared to have very little idea of how to write the formula of a salt that contains water of crystallisation.

Part (d) was only worth two marks and whilst it was pleasing to see many excellent descriptions of how to clean a platinum/nichrome wire, it is only necessary to state that a (clean) wire is needed. Some chose an inappropriate material to use as the wire. For example magnesium, which obviously will burn in a Bunsen flame, and copper which is likely to colour the flame and give a false reading. It would be nice to see mention of a non-luminous or roaring flame, but this was not insisted upon this time.

Question 7

In (a), very few candidates mentioned that gasoline is in such a high demand because of the large number of cars in the world. Some candidates effectively repeated the question by stating that it was in such high demand because it had a lot of uses. In (b), the vast majority had no problem in recognising the second hydrocarbon in (i). The name of the catalyst and the operating temperature were less well known. There were the obvious confusions between this process and the others listed in the specification, hence iron was often quoted as the catalyst and a temperature of 450 °C was sometimes given. In (c)(i), many candidates knew that this was a fast process and that the ethanol produced was pure. The fact that it was a continuous process was rarely mentioned. Some gave answers which were too vague e.g. 'more ethanol is produced', which did not score since the amount of ethanol produced depends on the amounts of starting materials taken: it is the yield that is relevant. There were many good answers to (c)(ii) with the most common responses being, 'it uses a renewable resource' and 'it takes place at low temperatures'. It is important for candidates to realise that references to cost in industrial processes must always be qualified with a reason.

Question 8

This question was a good discriminator, with the very best candidates having no problems in scoring full marks. Unfortunately these were in the minority. Common errors were to forget to divide by 1000 in (a) and hence to work in millimoles instead of moles, and to divide by 24 or 24,000 in either, or both, of (b) and (c), presumably because SO_2 is a gas! A surprising number of candidates did not realise that to convert mol/dm^3 to g/dm^3 it is necessary only to multiply by the M_r of SO_2. Some of those that did worked out the M_r of SO_4 instead or divided the answer from (c) by 64 instead of multiplying. It would be encouraging to see students applying common sense when considering their answers to calculations. It should be obvious that adding over 2kg of SO_2 to a litre of wine is not feasible and that if candidates arrive at answers like this they must have done something wrong.

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com

Order Code xxxxxxxx January 2012

For more information on Edexcel qualifications, please visit
www.edexcel.com/quals

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning