



Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel Combined GCSE

In Chemistry (1SC0) Paper 1CF

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1SCO 1CF

This examination session was a supplementary one for those candidates who could not be awarded a grade in Summer 2020 or who wished to improve on the grade they were awarded at that time.

For this paper, the entry was extremely small, and it should be borne in mind that comments made reflect what was seen and does not represent what would be normally seen at a complete cohort level.

Question 1(b)(iii)

A wide variety of answers were seen: from the correct shared pair of the covalent bond between the two hydrogen atoms scoring the mark to each hydrogen having an electron each but neither shared to both electrons just being on one atom both.

Question 1(c)(i)

The ideal answer of a pH meter was given by only a small number of candidates. Several others scored the mark for giving the answer universal indicator or pH paper, but there were several who thought that the pH scale only was necessary.

Question 2(a)(ii)

Only a minority answered in terms of number of outer shell electrons. Even fewer gave the answer in terms of electrons in outer shell matching group number. One candidate highlighted 7 as the last number in the electronic configuration. Many candidates said that chlorine is a halogen, so it belongs in group 7 and many others said that it is a non-metal and therefore belongs on the right-hand side of the periodic table.

Question 2(b)(ii)

A tiny minority of candidates scored both marks here. A few talked about charges balancing or cancelling out. Otherwise, there seemed no trends in incorrect answers.

Question 2(b)(ii)

Again, only a minority scored both marks. Few scored just one, usually where they got one of the particles wrong, eg same number of protons, different number of electrons, or where they referred to all three types of particles but got one wrong. A common wrong answer was to describe ions rather than isotopes. Yet again, some candidates got themselves into linguistic difficulties trying to explain a singular isotope in spite of being asked about isotopes.

Question 3(a)

This was relatively well answered, the most popular answer being in terms of fewer elements in Mendeleev's table, often expressed as more elements now known. A few talked about gaps or missing elements but there was no reference to ordering by atomic mass or to the absence of the noble gases. Many candidates seemed to think that Mendeleev's table had no groups. Some candidates talked about 'substances' or 'chemicals' rather than the required elements.

Question 3(d)(i)

This was the best answered question on this examination paper, the great majority of candidates scoring both marks. Candidates who scored zero generally did so because they had left a blank. Candidates lost one mark by drawing the atoms in the solid too far apart or the atoms in a gas too close together.

Question 3(e)

Some candidates scored well knowing that metals conduct electricity by electrons that can move. However, some thought it came down to weak intermolecular forces allowing electricity to pass through or vibrating particles releasing electricity or other reasons that could not be credited with any marks.

Question 4(b)

In answering this question, candidates need to bear in mind that they are comparing recycling metals with extraction from the ore and therefore answers in terms of simply reusing the metal or making something new from the metal miss the point. Many answers were simply too vague, eg 'better for the environment', 'doesn't waste the metal'.

Question 4(d)

Despite the stem of the question starting with the information that most copper ores were low grade and that the percentage of copper in those ores is very small, several candidates produced calculated values that were in excess of 100%. Several different were seen involving the two numbers of 5000 and 42.5, but only a few carried out the correct calculation and then converted it into a percentage. In addition, judging by the calculations seen, several candidates did not appear to be using calculators. This puts those candidates at a disadvantage.

Question 6(e)

While many candidates correctly identified that it was carbon that was oxidised, very few actually talked in terms of gaining oxygen. More just said that it was converted into carbon dioxide. Some identified lead, which was strange since lead was a product not a reactant. Some also identified lead oxide. It seems that some candidates learn the OILRIG mnemonic (some had written it in the margin of the paper) but do not recognise that it refers to electrons being lost and gained, not oxygen.

Question 4(f)

Few candidates knew that they had to divide masses by atomic masses. Most of those who did went on to score all 3 marks, However, some converted the result of the calculations into a simplest ratio and gave that as their final answer. Many candidates divided atomic masses by masses but then continued the calculation correctly and were able to score 2 of the 3 marks. Many candidates simply tried some mathematical combination of the four numbers given and produced a numerical answer. This sort of calculation in which candidates are asked to derive an empirical formula of a two-element compound from reacting masses is a very frequently see question so it is surprising that more candidates do not get it right.

Question 5(a)(i)

The test to show that a gas is hydrogen has appeared on several examination papers in the past and has proved to be answered well. However, on this occasion, many candidates did not read the question carefully enough and tried to answer how or why hydrogen was formed at the negative electrode. Only a few had read the actual question and gave a decent response. Some candidates gave the answer simply as 'squeaky pop test' and it has been noted in the past that this in itself does not score as this is the result of carrying out the correct test which needed to be given. Some confused the answer by saying to use a glowing splint and a pop is heard – again no marks as the incorrect test was given.

Question 5(a)(iii)

Explaining what electrolysis means was poorly answered. Some scored one mark for a reaction using electricity, but few linked that with the separation of ions or decomposing the compound.

Question 5(b)

This was a very straightforward calculation but very few candidates managed it. Far more divided 250 by 28.4 than the correct reverse of this. Many clearly did not recognise the relationship between cm^3 and dm^3 . Many also failed to round their answer correctly to 3 significant figures. It was also striking again in this series as in the June 2019 series that many candidates saw a ³ in the unit, in this case 250 cm^3 , and thought that they needed to cube the 250, so there were lots of answers featuring 15,625,000.

Question 5(c)

Using the formulae of ions to write the formula of a compound proved very difficult for most candidates taking this paper. Many just put the two ions together without balancing the charges, but several left this blank. Only a very small of candidates scored a mark for the correct formula of Na_2SO_4 .

Question 5(d)(i)

Few candidates offered a sensible suggestion of a piece of apparatus that could be used in place of the test tubes to collect and measure the volume of gas collected. Several hadn't thought through the difficulty of trying to use beakers or conical flasks in this electrolysis cell.

Question 5(d)(ii)

About a third of the candidates could suggest some that would show a current flowing in the circuit by giving the answer of a light bulb or an ammeter. Unfortunately, some suggested using a voltmeter, and several offered the very general 'a meter' as an answer and a few thought that arrows should be placed on the diagram to show the direction of current flow.

Question 6(a)(i)

Only two candidates sitting this paper could give the correct formulae of both missing substances from the equation and a just a few more scored one mark for the formula of copper sulfate. Of the

remaining candidates, leaving aside the numerous no responses, a variety of attempts at formulae showed a lack of knowledge in this area where the formula of sulfuric acid was given as 'NaH₂O' by one candidate.

Question 6(a)(ii)

It was found that just under a fifth of the candidates could perform a correct calculation to give the formula mass of copper carbonate. The most frequent error seen was candidates just adding the relative atomic masses of Cu, C and O to give an answer of 91.5. Another common error was seen where candidates had added the relative atomic masses together, the erroneously multiplied that number (91.5) by 3 to give a final answer of 274.4; while some divided the 91.5 by 3 to give the final answer of 30.5.

Question 6(b)(i)

This question revealed the poor knowledge of practical work by the candidates. Even though this item (and the next one Q06bii) being based on a core practical, very few could state two observations showing that the reaction had finished. One-mark answers were mostly given as 'no more bubbles' (or similar). The most frequent errors made by the candidates was from misreading the question: most answered by stating observations that a reaction was taking place -responses such as 'it changes colour' and 'bubbles are seen' were frequent but did not answer the question as given on the paper.

Question 6(b)(ii)

This question was poorly answered and again revealed candidates' lack of practical experience. It also showed that many candidates did not read and understand the question, some of them describing again the procedure already described in 6b(i) others describing the preparation of a solution of copper sulfate from solid copper sulfate. Of those who did show some evidence of having carried out practical work, it would seem many had little understanding of what they were doing being unable to describe the stages of crystallisation, for example, often getting things so badly out of order as to make no sense at all.

General comments

It is important that candidates take a calculator into the Chemistry papers otherwise they are put at a disadvantage when it comes to any calculations.

Throughout the paper, there were many blank responses, and with marking on-line, it's difficult to know whether it comes down to many candidates leaving out a few items, or a few candidates missing out many items.

Knowledge and experience of practical work was often lacking as shown up by several of the items on this paper.