Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

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In Chemistry (1CH0) Paper 1H

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Candidates generally performed well in the first question of the paper with the majority knowing that the 18 carat gold contains atom of different sizes. Of those that knew this many were then able to go on to explain that the 18 carat gold is stronger than 24 carat gold in terms of these different sized atoms disrupting the structure or preventing the layers from sliding. In some cases, candidates did not score as they simply stated that the other metals were stronger.

In part (b) of question 1, the majority of candidates were able to calculate the percentage of gold in the necklace and then go on to use the graph and their answer to determine the purity of the gold. Candidates also performed well in the last part of question 1, with many being able to correctly calculate the number of gold atoms in the ring. Where candidates did not score full marks, if was often because they forgot or made an error the calculation of the number of moles in step 1.

A good proportion of candidates were able to correctly recall the test for hydrogen gas in question 2(a)(i). In some cases, candidates stated that a glowing splint would be used rather than a lit splint. In these cases, no marks were awarded as the result for the test is dependent on the correct method being used. In part (a)(iii), the definition of electrolysis was well attempted by candidates with around a third being able to give a complete definition. Where candidates did not score both marks, it was often as they had not referred to the use of electricity or an electric current to decompose the electrolyte.

In part (b) of question 2, the majority of candidates were able to calculate the concentration of the sodium sulfate solution, in some cases candidates lost marks as they did not give their answer to three significant figures. In part (c) most candidates were able to use the information in the stem to write the correct formula of sodium sulfate.

Question 3 started, in question (a)(i) with a balanced equation for candidates to complete. Many were able to score with a good proportion gaining both marks available, where candidates lost a mark, it was often as they could not recall the formula for sulfuric acid. In part (ii) the vast majority of candidates were able to calculate the relative formula mass of copper carbonate to score both marks available.

Candidates did not perform as well in part (b), some candidates knew that an observation that would show that the reaction had finished would be that there was no more bubbling, of these only the better candidates could give another observation such no more solid dissolving. Some candidates lost marks as they tried to explain what was happening rather than stating observations.
Drawing the dot and cross diagram in part (c) of question 3 proved difficult for some candidates, the majority of candidates knew that the covalent molecule should contain shared pairs of electrons between the atoms, however some lost marks as they did not understand that there should be two shared pairs of electrons between the carbon and oxygen atoms rather than one. Those that did realise this often went on to complete the rest of the molecule correctly.

In question 4 (a)(i) the vast majority of candidates were able to write the steps of required to carry out the titration in the correct order and most were able to suggest an alternative piece of apparatus to a measuring cylinder that could be used to obtain exactly 25cm^3 of potassium hydroxide in part (ii) with most suggesting the use of a pipette. Some candidates suggested the use of a balance but this was ignored.

Part (b)(i) of question 4 was less well answered with few candidates being able to explain why a new mixture was evaporated rather than the original mixture from the titration. In part (ii) the majority were able to correctly calculate the percentage yield of potassium chloride to gain both mark points, although only the best candidates were able to suggest a reason why the actual yield was greater than the theoretical yield, with many just giving the opposite of why the yield can be lower rather than thinking through the question and scenarios that might lead to the yield being higher. A good proportion were able to calculate the atom economy in the last part of question 4 to gain the full four marks available. In some cases, candidates scored just 3 marks as they had a misconception of the meaning of decimal place and gave an answer of 80 rather than 80.5.

Candidates found it hard to draw an accurate and labelled diagram of apparatus used to filter a mixture in part (a)(i) of question 5. Many candidates lost marks as they did not give a scientific diagram and therefore showed closed funnels or did not draw any filter paper. Of those that did draw a correct diagram, many lost marks as they were vague with their labelling or labelled the funnel as 'filter'. Some candidates tried to label other parts of their diagram such as the filtrate or residue rather than sticking to the apparatus as requested by the question, these additions were ignored. More were able to score well in part (a)(ii) with the majority scoring two marks for understanding that the filtrate should be heated to concentrate and then dried in an oven or between filter papers.

Part (b) of question 5 focused on the chromatography of some inks containing coloured dyes. Those that did well in part (i) measured the spot accurately to calculate the Rf values. Candidates found it hard to state a way to change the experiment more accurate. Some stated that the experiment should be repeated, this was ignored, as was using a more accurate ruler. Part (iii) was a good discriminator, some candidates showed the understanding that a different solvent would be required, of those only the better candidates were able to explain that the different solvent was required to dissolve the ink.

Question 6 was well answered with a large proportion of candidates scoring the full three marks available. Of those that did lose marks it was often because they had made an error during the multiplication step, in some cases candidates tried to combine steps two and three and then confused themselves and repeated the division again. Part (b)(ii) was also well answered with many candidates scoring two or three marks. A good proportion of candidates appeared to understand the practical well with many being able to describe lifting the lid from time to time and needing to find the mass after heating. The best candidates correctly described heating to a constant mass.

Candidates found part (c) much harder, although a good proportion were able to correctly determine the formula of the iron oxide and then use it to complete the balanced equation

for the reaction. Some candidates were able to find the ratio of iron to oxygen but were unable to take this any further and so scored just two marks.

Question 7(a)(i) was another question that discriminated well. Many showed the understanding that increasing the temperature would increase the yield of products to score one mark, the better candidates knew that this was because the equilibrium was shifted to the right. In the same manner a good proportion of learners were able to calculate the number of moles of methane. Of those some knew that they needed to multiple this by four and some knew that they then had to multiply this by 24, only the best performed both of these steps. Other errors included multiplying the number of moles by the formula mass of hydrogen rather than the number of moles.

Candidates found the first extended open response on the advantages and disadvantages of providing electrical energy in a space craft using hydrogen-oxygen cells rather than chemical cells in question 7b quite challenging with few scoring a mark in level 3. The first major issue was with candidates understanding of what was meant by a chemical cell, with the majority thinking that these contained hydrocarbons which were burnt therefore causing the release of greenhouse gases. Another issue found with this question was with the candidates understanding of the command word evaluate. If a candidate is asked to evaluate, they should be reviewing the advantages and disadvantages to form a conclusion, few candidates formed a conclusion and this limited their marks. Where candidates scored, it was often for stating that the water produced by the fuel cell could be reused on the spacecraft or for showing an understanding that the hydrogen is flammable and would be difficult to store because it is a gas.

A good proportion of learners performed well in question 8(a)(ii) with many being able to explain that calcium would be found in period 4 of the periodic table because it has four shells of electrons. In some cases, candidates lost the second mark point as they stated that calcium has four outer shells of electrons which was rejected. Where candidates did not score, it was often because they did not read the question carefully and stated what group rather than what period of the periodic table calcium is found in. Fewer candidates scored in part (b)(i) and (b)(ii) with many giving observations such as fizzing rather than similarities in the products of the reaction in part (i). In part (ii) many candidates thought that calcium was in a different period to potassium and referred to calcium having more shells of electrons.

Candidates performed much better in the second extended open response candidates scoring across the whole mark range available. Those that did well were able to explain the bonding and structure of all three substances and why the properties of calcium chloride are different from the properties of calcium and chlorine, they were clear and careful with their use of scientific terms .Those that lost marks did so as they referred to free electrons or ions in the wrong context, or did not explain why the properties are different. Some candidates thought that the calcium chloride just took on a mix of the properties of calcium and chlorine.

Question 9(a)(i) also provided a good range of responses, a good proportion of candidates scored both marks and gave an explanation of why dilute hydrochloric acid is describe as a

strong acid. In some cases, candidates lost marks as they did not refer to the hydrogen ions being produced and simply stated that it fully dissociates to score the first mark point only.

Candidates found part (b) of question 9 quite difficult with few scoring the full 3 marks available. Those that did score tended to score all 3 marks. A large proportion copied the equation given in the question and did not seem to know what was meant by the term ionic equation.

Part (c)(i) also proved quite difficult with many thinking that litmus paper could be used to measure pH. Part (ii) was better attempted with many candidates scoring, Many knew that the pH would increase until the pH was above 7, some showed the understanding that the hydroxide ions react with the hydrogen ions, but only the best scored the fourth marking point showing an understanding that the concentration of hydrogen ions was reduced. Where candidates lost marks it was often that they thought that the pH decreased. Many candidates copied that the magnesium hydroxide was in excess from the stem of the question, this gained no credit.

Question 10(a)(iii) was also well attempted with many candidates scoring. The most common mark awarded was two, this was often scored for showing the understanding that equilibrium yield would increase and that the equilibrium would shift to the right. Only the best candidates were able to explain that the rate of attainment of equilibrium increases and that there is a decrease in number of molecules to score full marks.

In part (b)(i) candidates found it hard to suggest a reason for using ammonium sulfate and solid ammonium nitrate as fertilisers with many repeating them stem of the question and stating that it would to be to increase the yield. Candidates also found it hard to write the balanced equation for the reaction even though the names of all the reactants and products had been given, candidate should be familiar with the formula of common substances referred to in the specification. In the last question of the paper, 10(b)(iii), many candidates were able to give a similarity or a difference, but few were able to give both to score both marks available. The most common correct answer seen was the allowable answer that both use the same reactants.