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Examiners' Report

October 2025

Pearson Edexcel International Advanced Subsidiary Level In Chemistry
WCH13/01A

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Introduction

Q1(a)(i)

Many candidates scored M1, with the commonest correct answers being nichrome or platinum wire. A few candidates referred to 'Ni' instead of nichrome. Hydrochloric acid was frequently mentioned, as was the correct flame colour. However, some candidates omitted the mention of the flame, and those that included it, did not refer to the correct blue / non-luminous flame.

Q1(b)

The most common correct answer referred to anhydrous copper sulfate / $CuSO_4$. However, the colour change was often given incorrectly as colourless to blue instead of white to blue. Cobalt chloride/ $CoCl_2$ was seen less often, and the colour change for this was frequently correct, as blue to pink, although a few candidates wrote 'pink to blue' and did not score.

Q1(c)(i) and **(ii)**

Nitrogen dioxide NO_2, was frequently given and most candidates knew that this gas would be brown. There were a few wrong colours including 'yellow' and 'red-brown'. Many candidates also identified the second gas as oxygen / O_2, but struggled to describe the rest accurately, with just 'relight a splint' being insufficient.

Q1(d)

Some correct equations were seen. However, candidates found this difficult to answer as many did not know what the correct products would be, with '$Ba(OH)_2$', or just 'Ba' being frequently seen.

Q1(e)

Where the correct formula, SO_4^{2-} was given, the second mark for 'white precipitate' was often awarded. Some candidates did not score any marks as they referred to silver nitrate / Cl^- ions and a white precipitate of AgCl. There were also a few references to other chemical tests such as the silver mirror.

Q2(a)

The graph was generally well drawn. There were a few errors with the axes being the wrong way around and the scale not covering half of the graph paper which often led to plotting errors. Some candidates gave non-linear scales. Candidates should note that if using conventional symbols to label axes, then 't' refers to time and 'T' to temperature.

Q2(b)

Some candidates found this challenging, but nevertheless many good answers were seen. Common errors were extrapolating the diagonal line through the last five points, instead of using the last four, and drawing the vertical line up from 2 minutes instead of 2.5 minutes.

Q2(c)

Many candidates noted that the difference in temperature would be due to heat loss. The other answers in the mark scheme were rarely given, with the most common one credited being that the specific heat capacity would not be 4.18 J g^{-1} $^{o}C^{-1}$. A few candidates lost their mark by mentioning other factors such as 'incomplete reaction' (as in the additional guidance in the mark scheme). It should be noted that if the question asks for one reason, then only one reason is needed.

Q2(d)(i)

This was well-answered with a lot of candidates performing the calculation correctly. A few omitted the '-'sign, and there were some answers where the cycle had been applied incorrectly with a common incorrect answer being -53.7 where the 15.7 had been added to -69.4 instead of it being subtracted.

Q2(d)(ii)

The most common answer given for this question was that it would be hard to measure the temperature of a solid. Some candidates noted that it would be difficult to add the correct amount of water. Common incorrect answers involved references to heating and heat loss.

Q3(a)

This question proved relatively challenging, as although some candidates correctly stated that the concentration would be less, they did not explain that the mass of the sodium hydroxide would include the moisture. There were many examples of answers stating that the volume would increase which would not be relevant as the question asks how absorption of moisture would affect the concentration.

Q3(b)(i)

A range of answers were given for this question, with some candidates attempting to calculate the percentage uncertainty, which was not asked for in the question. A common incorrect answer was to give the range as 9.52-9.54, forgetting that the error would need to be doubled as the mass was measured twice during the procedure.

Q3(b)(ii)

This part of the question proved relatively straightforward, although a few candidates' mis-calculated the molar mass of borax.

Q3(c)(i)

Many candidates who could carry out the linked calculation parts of Q3(b)(ii) and Q3(c)(ii) failed to give the correct answer for the colour change of the indicator. It should be noted that it is important to learn the colour changes of the indicator solutions.

Q3(c)(ii)

Many candidates scored at least one mark for this part of question 3. Common mistakes were to use all three titres to calculate the mean titre and either omission or of the multiplication of the answer from Q3(b)(i) by two or dividing their answer by 2 and so losing access to M1.

Q4(a)(i)

Many students were able to identify the misty fumes as HCl, with a few giving the name instead of the formula. Common incorrect answers were NH_3, or $POCl_3$.

Q4(a)(ii)

This was well-answered with many correct responses of CO_2. A few candidates gave an answer of $CaCO_3$ which would not be a gas, and some other incorrect answers of H_2O were seen.

Q4(a)(iii)

Many candidates were able to identify the functional groups present as 'alcohol' and 'carboxylic' acids. Some did not read the question properly and gave the formulae instead. If both formulae were correct then they were only penalised once, so scored 1 mark.

Q4(a)(iv)

Many correct displayed formulae were seen, especially for the alcohol. The O-H did not have to be fully displayed to earn the marks for this part of the question. A few candidates gave a correct secondary alcohol for 'Q' which was awarded the marks.

Q4(a)(v)

Many candidates realised that the main differences in the IR spectra would be that the alcohol would not have a peak due to the C=O and that the carboxylic acid would. Some were not awarded the mark as they just identified the functional groups and did not say how this would affect the IR spectra. Some candidates lost marks for an O-H without the bond, which in this instance was not awarded as the bond is needed for the IR spectrum.

Q4(b)

The first part of this question relating to the bromine water was more often correct than the second. There were a few wrong initial colours given, but the majority of candidates knew that the bromine water would become colourless. Candidates found the second part of this question more challenging, with some incorrect starting colours, and references to results from different tests (such as the silver mirror).

Q5(a)(i)

Many candidates scored at least one mark on this question, with gloves being the most common safety precaution. There were many responses which included 'goggles' which was ignored as 'safety spectacles' (which are the same thing) was given in the question. The suggestion to reduced the concentration of hydrochloric acid was not awarded, as if the acid were diluted, then the procedure would not work.

Q5(a)(ii)

Some candidates realised that there would be a build-up of gas in the reaction which would need to be released to reduce the pressure. I was not sufficient just to write that 'a gas would be produced' as this answer was not linked t the pressure. A common incorrect answer was to refer to removing the lower layer.

Q5(a)(iii)

Many candidates struggled to answer this question with answers relating to the layers not separating being common. Some candidates wrote ‘cloudy to clean’ instead of ‘cloudy to clear’ and were not awarded the mark Q5(a)(iv)

Q5(a)(iv)

There were vary degrees of quality of diagrams submitted for this question. Some very clear diagrams were awarded full marks, but the majority lost points. The commonest errors were omitting ‘heat’, having the thermometer bulb too high or too low (some even in the solution), and not leaving a gap for venting between the condenser and the collection vessel.

Q5(a)(iv)

Thes question as the last on the paper proved challenging. Many candidates realised that the tertiary halogenoalkane would react the fastest, but some did not relate a faster rate to a quicker time. Fewer candidates were able to identify the primary halogenoalkanes and link the rate of their hydrolysis to the breaking of the C-X bond. Nevertheless, there were a number of well-written answers that scored all three marks.