Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International GCSE

In Chemistry (4SS0) Paper 1C

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Introduction

This was the second time that the new Single Award specification has been examined. As with the previous exam series, in Summer 2019, there was a wide range of candidate responses. The best candidates answered well across a range of topic areas and used terminology with accuracy.

Question 1

Although some candidates missed the instruction to use six circles, diagrams in part (a) were well-drawn and showed well-spaced atoms. Selecting the correct words and state symbols for the changes of state proved straight-forward for most candidates. The final part of the question was more challenging. Most answers simply said that the melting point would change – but didn't specify the direction! Those that did choose a direction often argued that it would go up, and not down. This part of the specification does not seem to be well known.

Question 2

Part (a) provided candidates with a fairly simple start to the question. In (a)(iii), many candidates chose to substitute L and M with the symbols of those elements from the Periodic Table. The examiners were happy to accept BeF_2 but several candidates lost the mark for using an incorrect symbol for fluorine. Candidates were confident in (a)(iv) with the elements having the same number of outer shell electrons, or being in the same Group, but some candidates incorrectly placed the elements in Group 1. The calculation in (b)(ii) is a fairly standard one, and most students were confident with the method, although several didn't read the instruction to give the answer to one decimal place.

Question 3

The examiners tried to reward different approaches in (a)(i), as answers focussed on different aspects of the practical. Methods were sometimes difficult to follow, so candidates should make sure that they list their points in a sensible, practical order. For an experimental method, it is perfectly acceptable to use bullet points to help structure an answer. Some candidates misread the question and described the way in which the results would be processed, rather than the method used to obtain the chromatogram. In (a)(ii), candidates often said that the food colouring contained B, but didn't always make the point that there were two dyes. Most candidates knew that dye A did not move because it was insoluble.

The calculation of the Rf value in (b) relied on taking the correct measurements, although it was common to see the distance from the spot to the solvent front used in place of the total distance moved by the solvent. The commonest distances were 15 mm and 58 mm, which gave a result of 0.2586… Many candidates lost a mark for truncating the answer to 0.258, or 0.25 rather than rounding it correctly.

In (c), most candidates seemed to think that the solvent was already on fire, and used fire extinguishers or heat-proof gloves.

Question 4

Tests for ions produced mixed answers in (b). The test for the lithium ion was generally confidently answered, with candidates naming a flame test, or describing it correctly. Examiners were expecting to see red or crimson as the colour of the flame. As with other questions on colours, examiners will usually ignore qualifying words like “dark” or “bright”, but will penalise an additional incorrect colour being added, such as “yellow-red”. The carbonate ion test was less well-known, with many candidates simply adding the carbonate itself to limewater, rather than reacting the carbonate with acid first to produce carbon dioxide gas.

The equation in (c) produced mostly correct answers.

Question 5

This practical has featured on Chemistry papers before, but the method did not seem to be familiar to many candidates. In particular, for an experiment where loss of mass is used to measure the rate, it was surprising to see so many candidates say that the cotton wool prevented gas from escaping!

The calculation in (b) was a novel question, but candidates scored well. The most common incorrect answer was 74.1 – but even candidates who obtained this answer frequently scored the mark for the units. Examiners were happy to accept g/s or gs^{-1} for the units mark. Drawing a curve is more challenging than drawing a straight line graph, but there were excellent attempts in (ii), although a few candidates did try to place a line of best fit through the points. Although examiners prefer to see the line going through the points, there is usually a little more tolerance with curves because they are more difficult to draw freehand. However, the mark for the line is not awarded if the curve is a series of straight lines, or is made of several “feathered” curves. In this case, too, the examiners did not allow the curve to dip below 146.0 g and then climb back up to the final point. Many candidates gave similar answers to (iii) and (iv). However, the key point was to notice that (iii) concerned the decrease in reactants, but (iv) was about the reaction stopping. Candidates should also have remembered that the dilute hydrochloric acid was in excess, so cannot have been used up.

Many candidates chose the mass, or the surface area, or calcium carbonate in (c)(i), although both were in the question. Others chose factors that would have no effect on rate eg the frequency of taking readings, or the nature of the reaction vessel. Surprisingly few candidates referred to surface area in (ii), and many also described the reaction as calcium carbonate 'dissolving'. In both (b)(iii) and (c)(ii), there were few correct references to collisions. Although there was no penalty on this occasion, candidates should be aware that concentration and surface area do not change the energy of the particles or collisions. In (iii), candidates described the reaction getting faster, or taking less time, but didn't always answer the question – which was about how the graph would be different.

Question 6

Part (a) elicited some good answers. The definition of hydrocarbon was answered correctly by most – although some candidates missed the idea of 'only'. There was some confusion with the molecular formula in (iii), with some candidates giving either an empirical formula or a general formula for alkanes. The bromine water test was frequently accurate – although candidates and teachers should note that the reagent for this test is bromine water, not bromine.

The description of intermolecular forces, and their effect on boiling point, continues to be an area where candidates struggle to find the correct terminology. Many candidates mixed arguments in (b)(i), with descriptions about intermolecular forces between atoms – or between nuclei and electrons –seen fairly often. Surprisingly few candidates were able to simply say that the hydrocarbons were all simple covalent molecules. Examiners were generous in (ii), accepting reference to stronger bonds – although a few accurate candidates did correctly refer to stronger intermolecular forces due to the larger molecular mass of the hydrocarbons.

The idea of heat loss was seen infrequently in (c)(i), with many candidates saying that the burner was some way from the beaker, but not going on to say why that would lead to a lower temperature rise. Balancing the equation in (ii) was a challenge for many, so those that scored a mark here were in the minority. The question about carbon monoxide produced a variety of incorrect responses – including flammability. Those who knew that the gas prevented oxygen transport in the blood often missed the easy point – that the gas is therefore toxic. Many candidates simply used "harmful", which was not credited. The final calculation provided 3 straightforward marks for many candidates. The most common error was to use 1g as the mass of water, rather than 100g.

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