Examiners' Report
Principal Examiner Feedback

January 2023

Pearson Edexcel International GCSE
In Chemistry (4CH1) Paper 1CR

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1a Question was answered well as most candidates correctly selected three words from the list

1b The movement of particles in a gas was well known but answers for a solid were sometimes not specific enough in stating vibration about a fixed position. Care should be taken reading the question as some answers were written about particles in liquids which was not asked for.

2a Gases in the atmosphere were well known. Carbon dioxide was by far the most stated greenhouse gas.

2bi Most candidates gave a correct colour to describe the appearance of the iron wool.

2bii The calculation proved accessible to most and was often correct. Candidates do need to take care with rounding of the answer they obtain from a calculator so their last decimal place is correct.

2biii This question was not answered well with too few focusing on the chemical reaction involving oxygen and many giving incorrect answers relating to the apparatus or the water.

3a The table was often completed correctly. The majority knew the correct name and identified the molecular formula. Writing the empirical formula was less well answered and a few did not label the general formula correctly.

3bi Most candidates gave a correct definition of isomers. Very few confused isomers with isotopes.

3bii Most isomers were drawn accurately with no missing C and H atoms or bonds. In a chain hydrocarbon bending the chain does not create an isomer as many suggested. There were though a significant number of correct structures drawn, one chain and one branched chain.

3ci Of those giving a formula as requested most wrote the symbols correctly. Too many candidates gave a name only so were not credited with a mark.

3cii,ciii These questions were well answered substitution and ultraviolet (UV) radiation was well known

3di A correct fully balanced equation was seen frequently. Those that did not balance the equation usually gained credit for the four correct formulae

3dii Carbon monoxide was identified by most candidates and many wrote a concise and correct response to the problem it causes to humans, limiting the capacity of the blood to carry oxygen.

4a A lack of precise answers was evident when looking for the two variables needing to be controlled in the investigation. Candidates should have focused on the two solutions reacting together for their answer and as it was investigating the rate of the reaction, concentration of the solutions should have been recognised as an important variable.

4b The graph was well plotted overall. The anomalous result was often identified correctly. A curve of best fit should not see a significant bend in the middle as was the case if the wrong anomalous result was chosen. Candidates should be encouraged to exercise care when drawing their curve lines and produce a single thin line. If a curve is asked for a series of straight lines will not gain credit.

4biv This question was rarely answered correctly and candidates did not try to explain how the anomalous result could have been arisen. Some tried but then gave two contrasting alternatives. If the wrong point was chosen before credit could still have been gained for a correct suggestion.

4bv Many correct gave a value and clearly showed their working on their graph.

4c This question was answered well. Most were able to convert the time into its reciprocal and answer in standard form. Candidates should be encouraged to match the number of figures in the time to the number of figures in their answer so here an answer to two decimal places would be best.

4d A well answered question with many detailed answers describing increased kinetic energy of particles linked to more frequent successful collisions. Clear concise well-structured answers were seen.

5ai, aii Both well answered. A few candidates were not able to calculate the molecular mass of methanoic acid

5aiii Most knew the definition of a hydrocarbon and could then apply this to explain why methanoic acid did not fit as a hydrocarbon

5bi This definition of a covalent bond was known by many and clearly stated. Others were unable to provide a definition and wrote generally about covalent bonds. Knowledge of definitions is important for gaining marks.

5bii Many clear correct diagrams. Some missed the lone pairs from the oxygen atoms but showed the bonding pairs correctly. Some candidates did not use the diagram of the structure at the start of the question and so gave an incorrect molecule which was not creditworthy.

5c Mostly correct answers seen. Candidates set out clearly their steps and so it was easy to follow and award all the marks. In a few instances the answer 5.9 (for number of H atoms) was incorrectly rounded to 5. Very few upside down calculations were attempted.

6ai,aii answered well but the colour of iodine was less well known.

6aiii Most answers gave the correct gas test. A few did describe a test for chloride ions.

6b This calculation was well done. A few missed the guidance to give the answer to one decimal place. Encourage candidates to be aware of these mathematical requirements.

6c Most candidates scored here and many knew chlorine was the more reactive. The brown colour of the solution from the displacement reaction was rarely seen and the common missed mark.

7a Here not as many candidates scored marks as was expected. Candidates need to be aware that observations are what you can actually see if you carry out the experiment/reaction. Too many answers did not give specific observations as requested.

7bi Exothermic was well known but giving out energy was insufficient. Heat, heat energy or thermal energy were required.

7bii Some correct equations seen. Too many though listed incorrectly Al_2 or Fe_2 in their equation.

7biii Explaining why the reaction was redox required specific reference to this reaction. It was expected that candidates would identify iron oxide as being reduced and not iron. This was a common error.

7ci Here clear correct answers that related to the actual chemical reaction were seen. Some candidates though did not follow what was happening or concentrated on the crucible and/or letting heat out.

7cii Correct answers were rarely seen and needed to describe how to obtain a more accurate answer for this experiment that was underway. Some candidates misunderstood what was required and spoke in general terms of repeating the whole experiment several times to get an average. It stresses the importance of core practical experiments being carried out or seen by students.

8ai Well answered

8aii This calculation was answered well with most candidates getting the correct mass.

8bi,bii Required diagram was not always well drawn and unusual apparatus was often seen. Too many delivery tubes failed to reach the limewater. Limewater was regularly labelled, and the result of the test very well known.

8c A wide range of answers seen. High scoring answers were well set out and clearly distinguished between the giant structure of silicon dioxide and the molecular structure of carbon dioxide. These answers could then describe overcoming the many covalent bonds of silicon dioxide to melt it and overcoming the weak intermolecular forces between the molecules of carbon dioxide. Confusion arose from those who described intermolecular forces in silicon dioxide and weak covalent bonds in carbon dioxide. Some candidates showed insufficient knowledge of the structure of solids and gases.

9ai Correct answers seen. The most common error was zinc nitrate being classified as a solid.

9aii A request for an observation that you can see. This led many candidates to correct answers relating to bubbling.

9bi Many were able to state that it was necessary to react all the acid.

9bii Mostly correct answers seen covering most of the marking points. Candidates clearly knew how crystals could be prepared and very few examples

of heating the solution to dryness were seen. Again clearly set out and concise answers scored best.

9c Proved to be a difficult equation to balance as $12H_2O$ needed to be listed. This was missed by many though credit was awarded for the correct formulae being given.

10a Some candidates could suggest that an even temperature would be achieved through stirring but fewer still suggested that stirring increased the rate at which the solid would dissolve.

10b The reading from the diagram was usually correct but too many failed to quote the temperature change to one decimal place so as to fit with the number supplied in the table.

10ci Most candidates scored both marks for a correct calculation.

10cii Not completed quite as successfully but yielding high marks. Most common error was either the wrong sign or no sign at all in the final answer. If there was an error in ci it was carried forward and marks were awarded for any subsequent calculation.

10d Many knew that sodium hydroxide (solution)was needed for the test but often candidates did not show that it was the gas (ammonia) released that they were meant to be testing.

10e Most candidates used the temperatures provided to identify a temperature rise, but not all even made reference to them. It was more concerning that with a temperature rise only half of candidates could state the reaction was exothermic. This seemed to be an area of definite confusion for some.

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