Pearson Edexcel

Examiners' Report

Principal Examiner Feedback

November 2020

Pearson Edexcel Combined GCSE

In Chemistry (1SC0) Paper 2CF

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Examiner's Report : 1SC0 2CF

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(c)

Assessing the idea behind the decrease in water vapour from the early atmosphere to that of today has been tested several times over recent years. However, on this occasion, few candidates scored marks for the Earth's atmosphere cooling, water vapour condensing so forming seas and oceans. Of those who gave an answer, many put it down 'climate change' (without stating the change), increased pollution or to more plants growing so using more water.

Question 1(d)(i)

Many candidates carried out the subtraction scoring just the first mark, but of those were several who forgot to approximate to the nearest whole number. Some made the approximation from 2.87 to 2.9 and just scored the first mark as well.

Question 1(d)(ii)

This item attracted a wide variety of answers from those who gave one of the correct acceptable answers to those who thought it was down to there being 'more trees' or 'more animals' (without saying why more animals would cause the increase in carbon dioxide levels). Here again, a number of candidates gave the vague answer of 'more pollution'.

Question 2(a)(i)

The lay-out for the answer caused a little confusion for some candidates but they then presented their answer in a way they thought best. Unfortunately, some candidates lost marks for writing 'potassium iodine' in place or 'potassium iodide' and similarly for lead iodide on the product side.

Question 2(a)(ii)

Most candidates scored the mark here either by stating the mass had not changed or remained the same.

Question 2(b)(i)

The accepted answer of 'measuring cylinder' was given by only a few candidates with many favouring 'measuring jug' or 'measuring beaker' which were not accepted and a couple of candidates who gave their answer as 'ruler'. Candidates do need to realise that other physical quantities can be measured such as volume and mass and they have their own pieces of apparatus that can measure volume, mass etc.

Question 2(b)(ii)

Many candidates realised that an initial temperature was needed and produced an answer that was acceptable, but here there were several no responses. There were a few confusing answers such as 'mix it and measure it.' without referring to what needed to be measured.

Question 2(b)(iii)

Several candidates knew why a polystyrene cup should be used here, but many thought that it was to be used because it doesn't change the temperature, or it could be disposed of afterwards or dissolving the ammonium nitrate in water would damage glass. The idea of preventing energy exchange between the content of the cup and the surroundings was not well understood by this group of candidates.

Question 3(a)

It was inevitable that at this time, many candidates suggested wearing a mask or 'PPE'. Neither were acceptable as the mask would not be useful with chlorine and PPE is too vague. Only a small number referred to using a fume cupboard or increased ventilation and a few more suggested wearing gloves to prevent contact with a toxic substance.

Question 3(b)(i)

Many candidates could use the information to write the word equation, but there was also a good number of no responses. Some candidates find it difficult to interpret that information given and this is seen where names are invented such as 'chlorine hyroiode' *(sic)* are seen. Some lost the mark by writing 'chloride' as a reactant in place of 'chlorine'.

On a general point about word equations, candidates need to be aware that they are not required to use symbols and writing such an equation has then made much more difficult as correct formulae then need to be used and balanced where necessary.

Question 3(b)(ii)

Many candidates opted for the vague answer of 'colour change' or 'change to another colour', which did not score and only a few could give the correct response of the litmus turning red. Some spoilt their answer by adding yellow or orange in addition to red. There were several candidates who confused chlorine in the first reaction with this test by stating that the indicator would turn colourless.

Question 3(b)(iv)

Many gave the correct answer of 'covalent', but there was probably a similar number of candidates giving the answers 'molecular bonding' or 'ionic'. There were a couple of candidates who lost the mark by giving the answer of 'covalent and ionic'.

Question 3(c)

This item produced a poor set of correct answers, with the most popular answer centering on the reactivity of sodium rather than either of the two halogens. Few candidates gave a correct answer that the bromine was being displaced by the chlorine or that chlorine is more reactive than bromine.

Question 3(e)

A good number of candidates were awarded the full 2 marks for this item. Those who were awarded one mark generally gained that from a reference to 150 g dm^{-3} concentration giving the maximum or peak conductivity.

The general description of an increase and then decrease in conductivity was often absent.A few candidates mis-interpreted the graph and described concentration as relying on conductivity.

Question 4(a)(i)

In this word equation, the candidates needed to know that the methane reacted with oxygen in the air during combustion and produced carbon dioxide as the other product. Although often oxygen was seen as a reactant, all too frequently 'methane oxide' was given as the other product. Very few scored both marks on this item

Question 4(a)(ii)

There was much confusion or plain lack of understanding here, only a few candidates were able to state that a limited supply or lack of oxygen was the cause of incomplete combustion. This was badly answered with a wide variety of incorrect reasons being offered along with a large number of no responses.

Question 4(d)(ii)

This item has a very mixed response, from those that showed exemplary working and the correct final answer to those that listed a number of arithmetic manipulations of the numbers and then chose one of the results as their final, and often incorrect, answer. A number of candidates were awarded 1 mark for the correct answer appearing in their working but followed by incorrect calculations and there was no answer on the answer line.

Question 5(b)

It was pleasing to see that on an item common with the H-tier paper, so many candidates on this paper scoring two marks for their answer. There were, however, several who just made reference to atoms of the two elements having the same number of electrons without reference to the outer shell, so this did not score.

Question 5(c)

Most candidates did not score here.

As usual there was confusion between covalent bonds (often referred to as 'molecular bonds') and intermolecular forces of attraction. Candidates should be drilled in the correct use of chemical terms in this are of structure and bonding, too many continue to fail to score or indeed contradict themselves through the use of muddled language.

The second mark was rarely awarded, candidates omitted to relate the low melting temperature to the amount of energy required.

Question 5(d)

In this item, many candidates could balance the equation by inserting '2' in the correct positions, but only a few could give the correct state symbols. State symbols are generally not well known candidates at this level, but candidates would be expected to know that here potassium is a solid and they were told that potassium fluoride is also a solid.

Question 5(f)(i)

Most candidates gave a boiling point of bromine that was acceptable a value from 51 – 70 ^{o}C was acceptable by reading off the bar chart shown. However, there some candidates who wrote down the value for bromine's melting point and there a few that gave a value that could not be easily explained, such as 45 ^{o}C.

Question 6(a)(i)

There were a few candidates who could relate particle size to surface area or the volume of gas produced in five minutes to rate of reaction, but very few could put this in a coherent answer to score the mark. Most candidates did not answer this item well.

Question 6(a)(ii)

A few candidates scored the full 3 marks but too many were confused by the units of volume being cm^3 and cubed the value of 90 to give 729 000 in their calculations. A large proportion of candidates did not convert the time, given in minutes, into seconds and thus could only be awarded 2 marks for their answer of 18.

Candidates need to be made aware that even if they produce an incorrect final answer, they can often be awarded some marks for their working, an incorrect answer with no working will always score zero.

Question 6(a)(iii)

Candidates were generally not able to give accurate responses and gained few marks here.

Too many responses:

- did not link an increase in temperature with an increase in energy of the particles
- stated that the particles started to move fast rather than moving faster
- inaccurately described the increase in frequency of collisions, often saying there would simply be 'more collisions'.

No candidate made reference to activation energy as this item also appeared on the higher tier, where this answer ay have been possible.

Question 6(b)

There were quite a few blank responses here. Those candidate who did respond generally scored, there were very few responses that had to be given no marks and a good proportion scored in Level 2.

A number of candidates described doing the reaction in the bottles of acid rather than using samples in reaction vessels such as beaker, conical flask or test tubes: candidates' awareness of general laboratory practice and apparatus seems to be poor. Some responses were confused by the double concentration acid and described procedures using twice the volume of one acid. When gas syringes were mentioned they were often described as connect to beakers, ie the apparatus would not have worked. A few responses did not describe a reaction in which zinc had been added to acid.

Candidates can climb through the Levels in such questions if they list apparatus to be used and then give simple statements of how they will use the apparatus, eg thermometer, to measure temperature before and after the reaction and then write a simple conclusion.

General comments

It is important that candidates should take a calculator into the examination. There were several instances see where it was clear that the candidate did not have a calculator.

Calculations, like on other papers, should be set out in a clear and logical way. Where more than one calculation is used, we ignore any calculation method that does not lead to the answer on the answer line.

In recent times it has frequently been seen that many candidates do not understand units. On this paper, many candidates cubed the value of 90 in Q06aii for no apparent reason. This misunderstanding was also seen on the examinations back in June 2019.

Just as in the 1SC0_1CF paper, it was so disappointing to see so many blank answers throughout the paper and often on what would be seen to be basic knowledge about the subject.

In preparation for examinations in the future, candidates should use the past examination papers as practice as this will give them experience of types of questions and the detail that is needed to obtain the marks – this is especially so of items that are asking for word equations, balanced equations and calculations.