

Examiners' Report November 2012

GCSE Chemistry 5CH1F 01

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Introduction

This is the fourth examination for this unit for the new specification. The paper offered good opportunities for candidates to express their knowledge with questions of varying difficulty and accessibility. There were good quality answers. However, candidates would benefit from being more specific in their answers and when asked to explain or to describe. It was found that questions surrounding practical scenarios were the most taxing for candidates.

This report will provide exemplification of candidates' work, together with tips and/or comments, for a selection of questions. The exemplification will come mainly from questions that required more complex responses from candidates.

Question 1 (b)(i)

This question was generally well answered with the majority of candidates scoring at least 1 mark for the iron. Fewer candidates scored the second mark for carbon dioxide, with a variety of different answers being given such as hydrogen, oxygen and carbon.

Question 1 (b)(ii)

This question was generally badly answered by candidates with the majority of candidates describing the literal meaning of reduced.

(ii) State what is meant by **reduced**. (1)

reduced ~~is~~ means that there is ^{less} ~~more~~ of something,
or it has been lowered.



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examiner comment

Here the candidate gives the literal meaning of reduced.



ResultsPlus
examiner tip

Candidates should ensure that when they are asked to state what is meant by a term the scientific meaning of the word is given.

Question 1(b)(iii)

Some candidates were able to give a correct statement about the reactivity of aluminium. However, far fewer were able to relate this to the method of extraction.

(iii) Part of the reactivity series is shown.

sodium
aluminium
zinc
iron
copper

Aluminium is found in the ore bauxite.

Aluminium is obtained from bauxite by electrolysis.

Explain why electrolysis has to be used to obtain aluminium from bauxite.

(2)

Because aluminium is high in the reactivity series and therefore gets is obtained using electrolysis.



ResultsPlus
examiner comment

This candidate has made a correct statement about the reactivity of aluminium but has then repeated the stem of the question instead of explaining why electrolysis has to be used to obtain the aluminium. This response was awarded 1 mark.



ResultsPlus
examiner tip

Candidates should ensure that they are using the command words to help them answer the question and that they are not just giving the stem of the question as their answer.

Question 1(c)

This question was poorly answered with many candidates giving very vague statements regarding cost or pollution. Those that did gain marks generally did so by stating that recycling would ensure that we did not run out of copper (conserving resources) or the idea that less copper would go to waste.

Another common wrong answer was to reuse the copper.

(c) A large amount of copper in use today has come from recycling copper.

Explain the advantages of recycling metals, such as copper, rather than obtaining them from their ores.

(2)

So the recycled metal can be used again.

(Total for Question 1 = 8 marks)



ResultsPlus
examiner comment

This answer would gain no credit.

(c) A large amount of copper in use today has come from recycling copper.

Explain the advantages of recycling metals, such as copper, rather than obtaining them from their ores.

(2)

A advantage could be cost, it costs alot less money to recycle something ~~than~~ than obtaining them from ores. Another advantage could be less damage from the environment because there will be smaller amounts of machinery compared to obtaining them from there ores which uses alot of machinery, therefore producing more carbon dioxide therefore damaging the environment more.

(Total for Question 1 = 8 marks)



ResultsPlus
examiner comment

This candidate has given a good explanation of their points regarding cost and pollution. This response was awarded 2 marks.



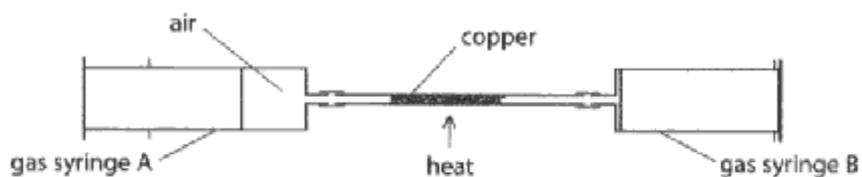
ResultsPlus
examiner tip

It is very important that if candidates are stating cost or pollution in their answers that it is qualified in some way to explain why it is an advantage or disadvantage. This is a good example.

Question 2(b)(i)

The majority of candidates were able to state at least one safety precaution. However, many gave vague comments about taking care which did not gain credit. Some candidates focused on the gas syringes and/or the connections between them or on checking that the apparatus had been set up correctly.

(b) The percentage of oxygen in a sample of air can be found by passing the sample of air over heated copper.



(i) State **two** safety precautions that need to be taken when carrying out this experiment.

(2)

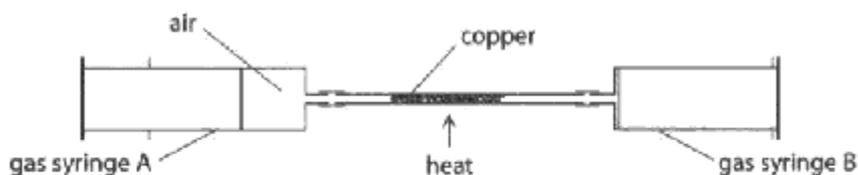
you need to wear goggles and gloves.



ResultsPlus
examiner comment

A good example where the candidate has scored both marks.

(b) The percentage of oxygen in a sample of air can be found by passing the sample of air over heated copper.



(i) State **two** safety precautions that need to be taken when carrying out this experiment.

(2)

wear gloves so you don't burn yourself as the copper is hot and to wear goggles to protect your eyes.



ResultsPlus
examiner comment

The candidate has given more detail in this case and has scored both marks.

Question 2(b)(ii)

A minority of candidates could describe the fact that copper **reacts** with oxygen and forms copper oxide. Many used vague terms such as absorb or takes in.

(ii) Explain how heated copper removes oxygen from the air.

(2)

The copper becomes oxygenated and
turns into copper oxide removing oxygen from
the air.



ResultsPlus
examiner comment

A good example of a 2-mark response.

(ii) Explain how heated copper removes oxygen from the air.

(2)

Copper attracts oxygen when ~~it~~
heated.



ResultsPlus
examiner comment

The candidate has some idea of what is going on here. However, they are lacking the scientific terminology that correctly explains the reaction happening.

Question 2(c)(i)

This was very poorly answered with many candidates stating that hydroxide was produced.

Question 2(c)(ii)

This was reasonably well answered. Most of those that gained credit did so for stating that a fuel cell would produce no pollution. However, many stated that less carbon dioxide was produced (indicating that some was still emitted) for which they gained no credit.

Question 3(a)(i)

This question was well answered with many candidates being able to recall that hazard symbols are there to serve as a warning. Those that did not gain credit failed to do so because their answers were too vague eg they keep you safe.

Question 3(a)(ii)

Many candidates could correctly identify the corrosive symbol. However, a large proportion confused irritant with corrosiveness and many just described what they could see on the label, eg it burns through the skin.

Acids

3 (a) The photograph shows bottles of some concentrated acids.



(i) There are hazard symbols on the bottles.

State why hazard symbols are used.

(1)

Hazard symbols are used to inform you of the dangers of using these acids.

(ii) This hazard symbol is on all the bottles of concentrated acid.



State the meaning of this symbol.

(1)

This symbol means that it can burn your skin or can get irritable.



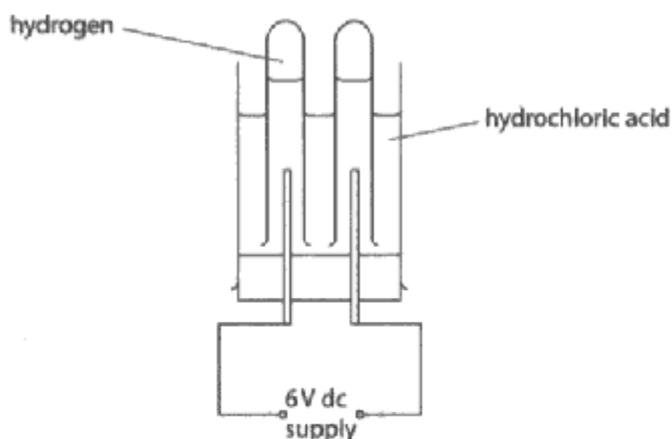
ResultsPlus
examiner comment

Here the candidate explains the use of a hazard label in part (a)(i). This answer was awarded 1 mark. In part (a)(ii) the candidate does not give the specific name of the hazard in, but instead describes the consequences of getting the concentrated acid on your skin. This response failed to gain any marks.

Question 3(d)(i)

Many candidates could not give the definition of electrolysis. Often candidates gained a mark for citing the use of electricity. However, many linked this with the separation of compounds which is ambiguous and did not gain credit. Many commented on the use of electrolysis for the extraction of metals from ores which was irrelevant in this context.

(d) The electrolysis of hydrochloric acid can be carried out using this apparatus.



(i) Explain what is meant by the term **electrolysis**.

(2)

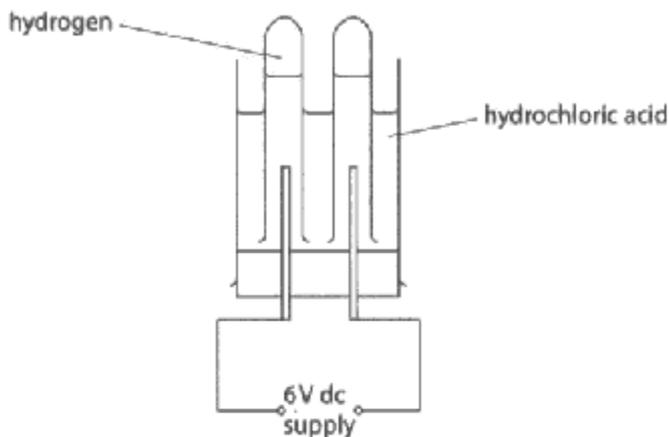
the extraction of metals using electricity



ResultsPlus
examiner comment

Many commented on the use of electrolysis for the extraction of metals from ores which was irrelevant in this context. This response was awarded 1 mark.

(d) The electrolysis of hydrochloric acid can be carried out using this apparatus.



(i) Explain what is meant by the term **electrolysis**.

(2)

Electrolysis is using electricity to separate two different things. The gas if one has been separated will stay at the top of the test tube.



ResultsPlus
examiner comment

Here the candidate defines electrolysis as the separation of two different things. Separation is ambiguous and did not gain credit. This response was awarded 1 mark.

Question 3(d)(ii)

Many candidates lost marks here as they incorrectly stated chloride instead of chlorine.

Question 3(d)(iii)

This question was well answered and many candidates gained the full 2 marks. Those that gained just 1 mark knew what the test was but failed to describe the use of a lighted splint. Some candidates incorrectly described the limewater test for carbon dioxide.

(iii) Describe the test to show a gas is hydrogen.

(2)

The pop test, when you heat it up
It should make a "pop" sound.



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examiner comment

This candidate gained just 1 mark as they failed to describe the use of a lighted splint.



ResultsPlus
examiner tip

It is important that when asked to describe a chemical test for a substance, the method of testing is given along with the result expected.

(iii) Describe the test to show a gas is hydrogen.

(2)

To test for hydrogen gas you put a lighted
splint towards hydrogen and a squeaky
pop sound will be made.



ResultsPlus
examiner comment

A good description of the test to show that a gas is hydrogen.

Question 3(e)

Many candidates gave chlorine as the answer here.

Question 4(a)

Very well answered with over half of the candidates scoring full marks.

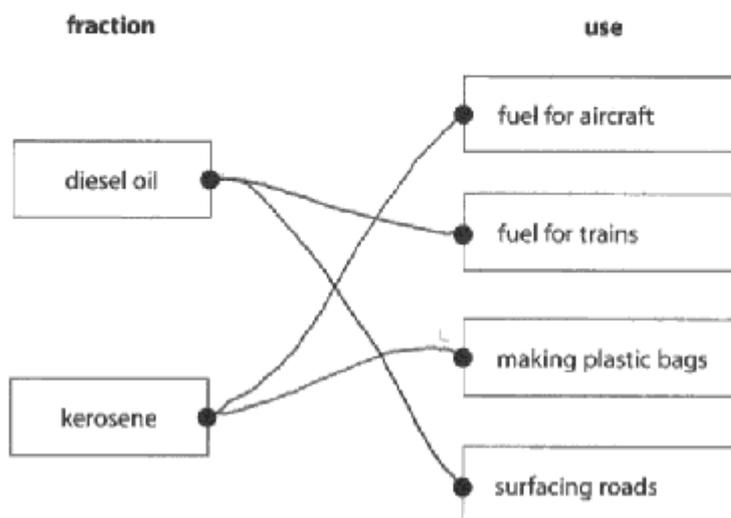
Hydrocarbons

4 (a) Crude oil is separated into useful fractions by fractional distillation.

Diesel oil and kerosene are two of these fractions.

Draw **one** straight line from each of these fractions to a use of the fraction.

(2)



ResultsPlus
examiner comment

Some candidates did not just draw one line as asked in the question.



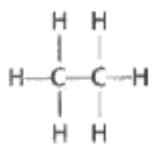
ResultsPlus
examiner tip

Candidates should follow instructions by drawing one line. Even if one of the two lines had been correct no marks would have been awarded.

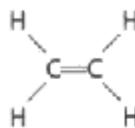
Question 4(b)(i)

The question was very poorly answered. Many candidates stated that an alkane had a single bond. They did not however, state that the single bond was between the two carbon atoms or that an alkane has **only** single bonds.

(b) Molecules of two compounds **W** and **X** are shown.



molecule of compound **W**



molecule of compound **X**

(i) Compound **W** is an alkane.

Explain what is meant by the term **alkane**.

(2)

alkane means it has a single bond. So molecule of compound **W** is alkane because it has a single bond.



ResultsPlus
examiner comment

This candidate needed to state that there are only single bonds.

Question 4(b)(iii)

This question was poorly answered. It was clear that many candidates knew this test and the results that it produces. However, many gave the correct descriptions but did not refer to **W** and **X** so no credit could be gained.

(iii) Describe what you would see when bromine water is shaken with separate samples of compound W and compound X.

(2)

When bromine water is shaken with compound W the bromine water will still be the same colour but when it is shaken with compound X the solution becomes colourless.



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A good description of what you would see when bromine water is shaken with each sample. This response was awarded 2 marks.



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Candidates need to be more specific and ensure they relate their answers to the situation given and not just give a generalised answer. This is a good example where the candidate has described what would be seen for compound W and compound X. Candidates that omitted the W and X gained no credit for their answers.

Question 4(d)

Very few candidates understood this question. Many discussed the process of polymerisation.

(d) Alkenes are used to make polymers such as poly(propene).

Uses of polymers depend on the properties of polymers.

Explain how a use of poly(propene) depends on one of its properties.

(2)

Poly(propene) depends on one of its properties by relying on the alkene.

(Total for Question 4 = 10 marks)



ResultsPlus
examiner comment

This candidate repeats the stem of the question and gains no marks.

(d) Alkenes are used to make polymers such as poly(propene).

Uses of polymers depend on the properties of polymers.

Explain how a use of poly(propene) depends on one of its properties.

(2)

poly(propene) depends on propene because without propene the polymerisation will not take place.

(Total for Question 4 = 10 marks)



ResultsPlus
examiner comment

The candidate has misunderstood the question and tried to relate it to polymerisation. This response failed to gain any marks.

(d) Alkenes are used to make polymers such as poly(propene).

Uses of polymers depend on the properties of polymers.

Explain how a use of poly(propene) depends on one of its properties.

(2)

The use of polypropene depends on one of its properties because the Carbons and hydrogen are either added or even, depending on these amounts will change the properties of poly(propene).

(Total for Question 4 = 10 marks)



ResultsPlus
examiner comment

The candidate has tried to link the amount of hydrogens and carbons to the change in properties but has not given a property or a use of poly(propene). This response failed to gain any marks.

Question 5(a)

This question was well answered with many candidates gaining both marks.

Limestone

5 Limestone is a sedimentary rock.

(a) Explain how sedimentary rocks are formed. (2)

Sedimentary rocks are formed after been crushed between 2 layers of dirt and sand for thousands of years.



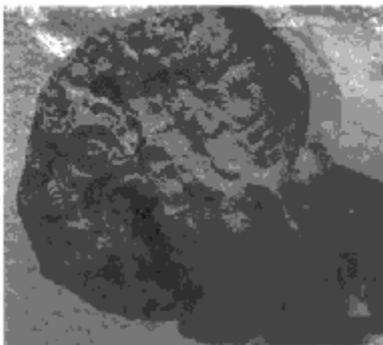
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examiner comment

A good answer which gained both marks.

Question 5(b)

This question was well answered with the majority of candidates being able to state that fossils were present in the sedimentary rock.

(b) The photograph shows a piece of limestone.



State what can be seen in this photograph that shows limestone is likely to be a sedimentary rock. (1)

You can see fossils within the rock which means it has been buried for a very long time.



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Good for 1 mark.

Question 5(c)

This question was not well answered with the majority of candidates thinking that the limestone was being added as a fertiliser or insecticide or simply to help the plants grow.

(c) Limestone contains calcium carbonate.

Farmers spread powdered limestone on their fields.

State why limestone is spread on fields.

limestone is spread on fields to help ⁽¹⁾
the grass grow from the soil.



ResultsPlus
examiner comment

A common incorrect response.

(c) Limestone contains calcium carbonate.

Farmers spread powdered limestone on their fields.

State why limestone is spread on fields.

Limestone is spread on fields so crops will grow more faster,
and the birds will keep away. ⁽¹⁾



ResultsPlus
examiner comment

Another common misconception.

Question 5(d)

Generally well answered.

(d) Marble can be formed from limestone.

Marble is a metamorphic rock.

Describe the conditions needed for limestone to change into marble.

Extreme heat and pressure. ⁽²⁾



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To the point, a full 2 marks.

Question 5(e)

This question was very poorly answered by candidates. The practical nature of this question seemed to throw candidates, with the majority not knowing where to start. Some candidates were able to state that the calcium carbonate was to be heated but it was very rare to see anything above or beyond this. Many candidates thought that hydrogen should be added to calcium oxide, with varying methods describing how to do so.

Describe how limestone is converted into limewater in the laboratory, using these reactions.

(6)

Limestone is converted into limewater in the laboratory by adding calcium oxide to calcium carbonate then that causing a reaction between those two properties to form calcium hydroxide solution which is limewater.



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This response failed to gain any marks. It was common to see answers that showed little understanding of this practical. Centres should ensure that candidates have the opportunity to witness the practical either by carrying it out themselves or by watching a demonstration.

Describe how limestone is converted into limewater in the laboratory, using these reactions.

(6)

When the limestone CaCO_3 is heated the oxygen in the limestone is reduced and forms CaO , hydrogen is then added to the calcium oxide (CaO) and reacts with the oxygen to form hydroxide and the oxygenation takes place, adding oxygen to form calcium hydroxide solution, which is limewater or Ca(OH)_2 .



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In this example, the candidate has correctly stated that the limestone should be heated to form calcium oxide. However no further detail was given for this step nor any correct detail for the second step. This response was awarded 1 mark.

Describe how limestone is converted into limewater in the laboratory, using these reactions.

(6)

The limestone (calcium carbonate) gets heated with oxygen and turns into calcium oxide, then add water to the calcium oxide, heat it and then it forms lime water (calcium hydroxide solution).



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One of the better answers seen. In this example, the candidate has stated that the calcium carbonate should be heated to form calcium oxide. They also state that water should be added to the calcium oxide to form the limewater. While this is one of the better answers, neither step was well described and errors are still included. This response was awarded 3 marks.

Question 6(a)(i)

Many candidates could give the correct products of this reaction and therefore gained 1 mark for the right-hand side of the equation. However, many forgot to include oxygen as a reactant so scored no marks on the left-hand side of the equation.

Candidates generally scored 1 mark in this question for the products side of the equation. Many candidates lost marks here as they omitted the oxygen on the reactants side of the equation.

The changing atmosphere

- 6 (a) (i) The composition of the atmosphere changes when fossil fuels are burned in air.

When methane undergoes complete combustion carbon dioxide and water are formed.

Write the word equation for the complete combustion of methane.

(2)

methane → carbon dioxide + water



ResultsPlus
examiner comment

Many candidates forgot to include oxygen in the equation. This response was awarded 1 mark.

The changing atmosphere

- 6 (a) (i) The composition of the atmosphere changes when fossil fuels are burned in air.

When methane undergoes complete combustion carbon dioxide and water are formed.

Write the word equation for the complete combustion of methane.

(2)

Methane + Oxygen → Carbon dioxide + water



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A fully correct equation for 2 marks.

Question 6(a)(ii)

Most could describe the effects of carbon monoxide and the better candidates could explain why it is toxic. However, few described the effects of carbon. Quite a few failed to distinguish between carbon and carbon monoxide, saying **they** cause damage and could kill you. Many candidates described global warming which was irrelevant in this context.

- (ii) Incomplete combustion of methane can produce carbon and carbon monoxide.

Describe some of the problems caused by these products.

(2)

Contributes towards global warming.



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Many candidates incorrectly made reference to global warming. This response failed to gain any marks.

Question 6(b)

This question was poorly answered as candidates were unable to identify sulphur as an impurity in fossil fuels. Acidic gases were described as going into or mixing with clouds. Many candidates often confused carbon dioxide and impurities and many went on to describe the effects of acid rain.

(b) Describe how impurities in fossil fuels result in the formation of acid rain.

(2)

Fossil fuels can form acid rain because of the the burning of the fossils can get into the air and cause it to get acid rain.



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A very vague answer which gains no credit.



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examiner tip

Candidates should take that they answer the question given and not answer a question that is not there. Many candidates did not gain credit in this question and their response related just to the problems associated with acid rain. This question asks about how acid rain is formed.

Question 6(c)

This question proved very accessible to candidates and the full range of marks was awarded. The vast majority of candidates achieved some marks for describing some processes. Better candidates used the correct scientific terms, eg respiration, combustion, photosynthesis. Less able candidates referred to breathing instead of respiration, burning instead of combustion. Some candidates mentioned deforestation but gave no explanation of how this would affect carbon dioxide levels.

Paper Summary

There seemed to be many more blank spaces than in previous sessions.

Based on their performance on this paper, in order to improve performance candidates should:

- ensure that they revise all the experiments, especially the core practicals, that they have carried out or have seen demonstrated so that they can describe them and explain the chemistry
- learn the **scientific meanings** of the key terms in each topic.

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