



Additional Assessment Materials
Summer 2021

Pearson Edexcel GCSE in Chemistry (1CH0)
Higher

Resource Set Topic N: Qualitative analysis,
bulk and surface properties of matter

Questions

(Public release version)

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General guidance to Additional Assessment Materials for use in 2021

Context

- Additional Assessment Materials are being produced for GCSE, AS and A levels (with the exception of Art and Design).
- The Additional Assessment Materials presented in this booklet are an **optional** part of the range of evidence teachers may use when deciding on a candidate's grade.
- 2021 Additional Assessment Materials have been drawn from previous examination materials, namely past papers.
- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.

Purpose

- The purpose of this resource to provide qualification-specific sets/groups of questions covering the knowledge, skills and understanding relevant to this Pearson qualification.
- This document should be used in conjunction with the mapping guidance which will map content and/or skills covered within each set of questions.
- These materials are only intended to support the summer 2021 series.

8 Qualitative tests are used to identify ions in compounds.

(a) Solid **X** contains two ions.

The tests for these ions and their results are shown in Figure 10.

test	result
flame test on solid X	red-orange flame
dilute nitric acid is added to an aqueous solution of X , followed by silver nitrate solution	white precipitate forms

Figure 10

Use the information in Figure 10 to name the cation and the anion in solid **X**.

(2)

name of cation

name of anion

(b) Another solid, **Y**, also contains two ions.

A test was carried out on solid **Y**.

A few drops of sodium hydroxide solution were added to a solution of solid **Y**.
A white precipitate formed.

(i) Give the reason why this test does not identify the cation in solid **Y**.

(1)

.....
.....
.....
.....

(ii) Give the reason why this test does not identify the anion in solid **Y**.

(1)

.....
.....
.....
.....

(c) Instrumental methods are often used for analysis.

Give a reason why instrumental analysis may be better than other methods of analysis.
(1)

(d) Iron(II) sulfate solution reacts with sodium hydroxide solution to form a pale green precipitate of iron(II) hydroxide, $\text{Fe}(\text{OH})_2$.

(i) Write the ionic equation for this reaction.
(3)

(ii) The green iron(II) hydroxide precipitate gradually turns brown when exposed to air.
Explain this observation.
(2)

5 (a) Figure 4 shows information about a ceramic and a metal.

	ceramic	metal
flexibility	low	high
hardness	medium	low
reaction with water	no reaction	very slow reaction
density	medium	high

Figure 4

The ceramic, rather than the metal, is a more suitable material for washbasins.

Give a reason for this, using a property from Figure 4.
(1)

1

(b) Nanoparticles are very small particles that have unusual properties.

(i) Particles less than 100 nanometres in size are classified as nanoparticles.

100 nanometres is

(1)

- A** 1×10^{-4} metres
- B** 1×10^{-5} metres
- C** 1×10^{-7} metres
- D** 1×10^{-9} metres

(ii) Nanoparticles of titanium(IV) oxide are used in some sunscreens.

Describe a reason why nanoparticles of titanium(IV) oxide are used in some sunscreens.

(2)

(iii) Some people are concerned that there is a risk when sunscreens containing nanoparticles are used.

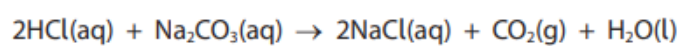
Explain a possible risk associated with using nanoparticles in sunscreens.

(2)

- 10** (a) A sample of potassium carbonate is contaminated with a small amount of sodium carbonate.
When a flame test is carried out on the sample, a bright yellow flame is seen.

Describe how you could show that potassium and sodium ions are present in this sample.
(2)

- (b) Hydrochloric acid reacts with a solution of sodium carbonate.



(3)

Write the ionic equation for this reaction.

1 (a) A chloride ion, a fluorine atom and a nanoparticle are all types of particle.

Which of the following shows the particles in order of size, starting from the smallest?

(1)

- A nanoparticle, fluorine atom, chloride ion
- B nanoparticle, chloride ion, fluorine atom
- C fluorine atom, nanoparticle, chloride ion
- D fluorine atom, chloride ion, nanoparticle

(b) A solution, **X**, is thought to contain chloride, bromide or iodide ions.

(i) The solution is tested to see whether it contains one of these ions. In the test, a few drops of **two** different solutions are added to **X**.

Name the two solutions that are added in the test.

(2)

solution 1.....

solution 2.....

(ii) The student carrying out the test records the following result.

A precipitate forms in the test tube. The precipitate is a cream/yellow colour.

Explain why the anion in **X** cannot be known for certain.

(2)

.....

.....

.....

.....

(iii) The metal ions in **X** could be identified using a flame test.

There is a more sensitive and accurate instrumental method that can be used.

Give the name of an instrument that can be used to identify the metal ions in **X**.

(1)

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TOTAL FOR PAPER IS 33 MARKS