



Additional Assessment Materials
Summer 2021

Pearson Edexcel GCSE in Chemistry (1CH0)
Foundation

Resource Set Topic N – Test 1: Separate
Chemistry 2 (F tier only)

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- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.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.

2 Figure 3 shows two tests carried out on a white solid and the results of the tests.

	test	results
test 1	flame test carried out	a yellow flame
test 2	dilute hydrochloric acid added gas given off passed into limewater	effervescence occurs the limewater goes milky

Figure 3

(a) Which ion is shown to be present by the result of test 1?

(1)

- A lithium
- B sodium
- C potassium
- D calcium

(b) (i) State the name of the gas given off in test 2.

(1)

(ii) State the name of the ion shown to be present in the white solid by the result of test 2.

(1)

- (c) A flame photometer can be used to measure the concentration of potassium ions in a solution.

Figure 4 shows the photometer readings for three different concentrations of potassium ions in solutions.

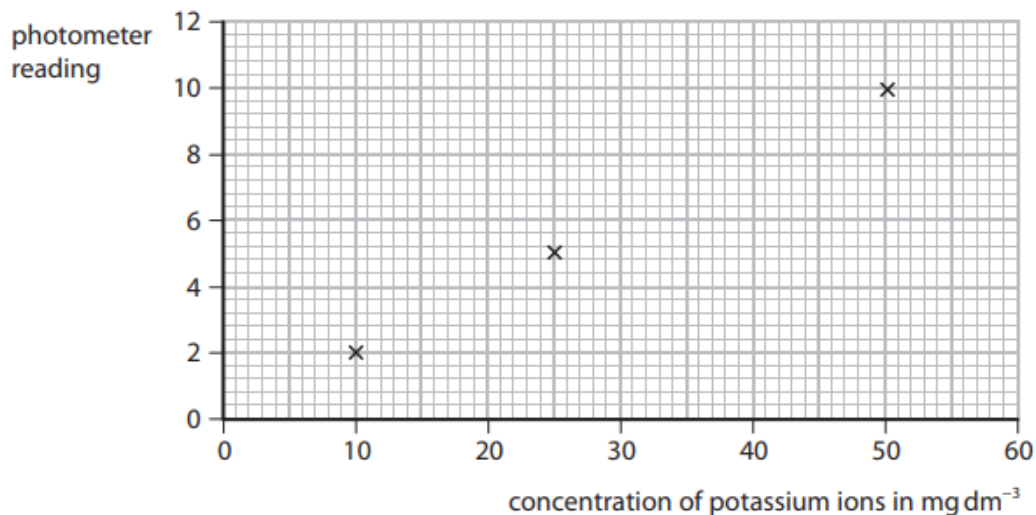


Figure 4

- (i) A solution containing a concentration of potassium ions of 35 mg dm^{-3} is placed in the photometer.
The photometer reading is 7.0.

Plot this point on the graph and then draw the straight line of best fit.

(2)

- (ii) Another solution of potassium ions gives a photometer reading of 9.0.

Use the graph to find the concentration of potassium ions in this solution.

(1)

concentration = mg dm^{-3}

4 (a) Nanoparticles are found in some sunscreens.

(i) An atom has a radius of about 0.1 nm.

A nanoparticle might have a radius of about

(1)

- A 0.01 nm
- B 0.1 nm
- C 50 nm
- D 1 cm

(ii) A useful property of nanoparticles in sunscreens is that they

(1)

- A have a low surface area to volume ratio
- B are toxic
- C are white
- D prevent harmful UV radiation reaching the skin

(iii) A nanoparticle has a surface area of $38\,400\text{ nm}^2$ and a volume of $51\,200\text{ nm}^3$.

Calculate the surface area to volume ratio.

(2)

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.....

.....

.....

surface area to volume ratio = 1.00 :

(b) The molecules of three organic substances **A**, **B** and **C** are shown in Figure 6.

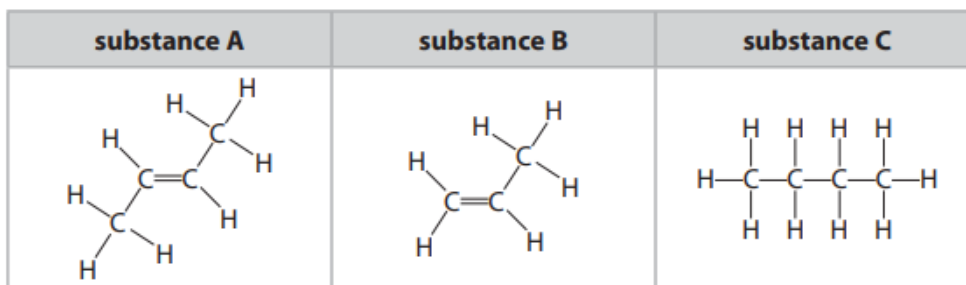


Figure 6

- (i) A small volume of bromine water is added to each of the substances **A**, **B** and **C** and the mixtures shaken.
Explain why **A** and **B** decolourise bromine water but **C** does not.

(3)

- (ii) Ethane, C_2H_6 , is a hydrocarbon.

Draw a molecule of ethane showing all covalent bonds.

(2)

- (iii) State why ethane is described as a **hydrocarbon**.

(2)

- 7 (a) Qualitative tests are carried out on ionic substances to identify the ions present in the substances.

The test for a given ion must be unique to that ion.

- (i) Explain why the test for a given ion must be unique to that ion.

(2)

- (ii) In the test for the carbonate ion, CO_3^{2-} , dilute hydrochloric acid is added to the solid being tested.

State the name of the gas produced in the test if carbonate ions are present.

(1)

- (iii) Tests for three ions are described.

Draw one straight line from the test for each ion to the observation that shows that ion to be present.

Each observation may be correct for one test, more than one test, or for none of the tests.

(3)

description of test	observation
test for chloride ion: add dilute nitric acid followed by silver nitrate solution ●	● green precipitate
test for iodide ion: add dilute nitric acid followed by silver nitrate solution ●	● red precipitate
test for sulfate ion: add dilute hydrochloric acid followed by barium chloride solution ●	● white precipitate
	● yellow precipitate

(b) (i) Nanoparticles are very small.

Some nanoparticles have a radius of 17 nm.
The radius of a magnesium atom is 0.16 nm.

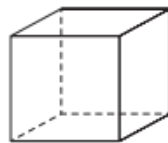
Approximately how many times larger is the radius of these nanoparticles than the radius of the magnesium atom?

(1)

- A** 0.01
- B** 0.10
- C** 10
- D** 100

(ii) A catalyst contains cube-shaped nanoparticles.
Figure 3 shows a diagram of a cube-shaped nanoparticle.

The length of each side of the cube is 9 nm.



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Figure 3

Calculate the surface area of the cube, in nm^2 .

(2)

.....

.....

.....

surface area = nm^2

(iii) Nanoparticles have many uses.
Some scientists are concerned about the possible risks of using nanoparticles.

Give **one** possible risk of using nanoparticles.

(1)

.....

.....

4 Tests are carried out to identify the ions in two solids, **P** and **Q**.

(a) A flame test is used to identify the metal ions in each of these solids.

(i) Describe how to do a flame test.

(2)

(ii) Different metal ions produce different coloured flames.

Draw one straight line from each metal ion to its flame colour.

(2)

metal ion	flame colour
	<input type="checkbox"/> green
<input type="checkbox"/> calcium	<input type="checkbox"/> yellow
	<input type="checkbox"/> lilac
<input type="checkbox"/> potassium	<input type="checkbox"/> orange-red
	<input type="checkbox"/> blue-green

(b) **P** and **Q** dissolve in water to form colourless solutions.

Figure 7 shows the results of tests on these solutions.

test	results	
	solution of P	solution of Q
dilute hydrochloric acid added, then barium chloride solution	a white precipitate	remains colourless
dilute nitric acid added, then silver nitrate solution	remains colourless	a yellow precipitate

Figure 7

(i) The anions in solutions of **P** and **Q** can be identified from the results of the tests shown in Figure 7.

Draw one straight line from each solution to the anion present.

(2)

solution	anion
<input type="checkbox"/> solution of P	<input type="checkbox"/> bromide
<input type="checkbox"/> solution of Q	<input type="checkbox"/> carbonate
	<input type="checkbox"/> chloride
	<input type="checkbox"/> iodide
	<input type="checkbox"/> sulfate

(ii) The formula of barium chloride is BaCl_2 .

Give the total number of ions in the formula BaCl_2 .

(1)

.....

(c) A few drops of sodium hydroxide solution are added to a solution of iron(II) sulfate. Iron(II) hydroxide is formed.

(i) State what would be **seen**.

(2)

(ii) One other product is formed in this reaction.

What is the name of this other product?

(1)

- A iron(II) chloride
- B sodium chloride
- C sodium sulfate
- D water