

Using Earth's res, Potable Water

Question Paper 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.10 Using Resources
Sub-Topic	Using Earth's res, Potable Water
Difficulty Level	Silver Level
Booklet	Question Paper 1

Time Allowed: 56 minutes

Score: /55

Percentage: /100

Grade Boundaries:

Q1.(a) The hydrocarbon $C_{16}H_{34}$ can be cracked.

Balance the equation for cracking $C_{16}H_{34}$



(1)

(b) Describe the differences between cracking and distillation.

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(2)

(c) What type of reaction is cracking?

Tick **one** box.

Combustion

☐

Decomposition

☐

Neutralisation

☐

Precipitation

☐

(1)

(d) Ethene is used to make poly(ethene).

Poly(ethene) is used to make plastic bags.

the table below shows data from a Life Cycle Assessment (LCA) for a plastic bag and a paper bag.

	Plastic bag	Paper bag
Raw materials	Crude oil or natural gas	Wood
Energy used in MJ	1.5	1.7
Mass of solid waste in g	14	50
Mass of CO ₂ produced in kg	0.23	0.53
Volume of fresh water used in dm ³	255	4 520

A company stated: 'A Life Cycle Assessment shows that using plastic bags has less environmental impact than using paper bags'.

Evaluate this statement. Use your knowledge and the information from above the table above.

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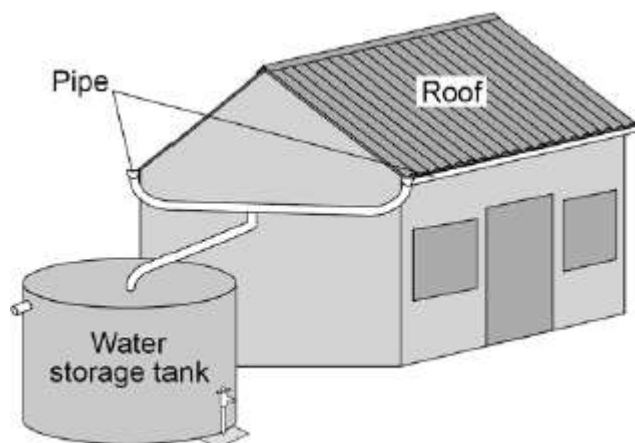
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(6)
(Total 10 marks)

Q2. Rainwater is collected from the roofs of houses as shown in **Figure 1**.

Figure 1



- (a) The water in the storage tank is **not** potable.

What does potable mean?

Tick **one** box.

Contains dissolved
substances

☐

Pure

☐

Safe to drink

☐

Tastes nice

☐

(1)

- (b) Why should the water in the tank be filtered to make it potable?

Tick **one** box.

To kill microbes

☐

To remove dissolved gases

☐

To remove dissolved solids

☐

To remove undissolved solids

☐

(1)

- (c) A gas which bleaches litmus paper can be added to the water to make it potable.

Name this gas and explain why it is added.

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(2)

- (d) The storage tank is made from concrete reinforced with steel wire, as shown in **Figure 2**.

Figure 2.

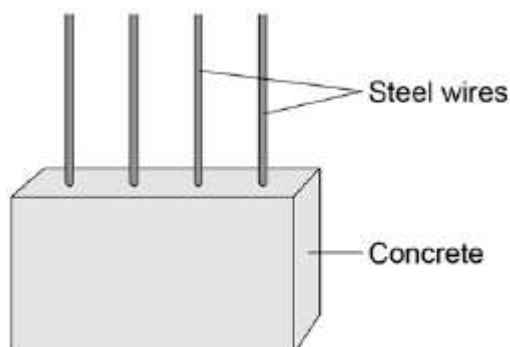
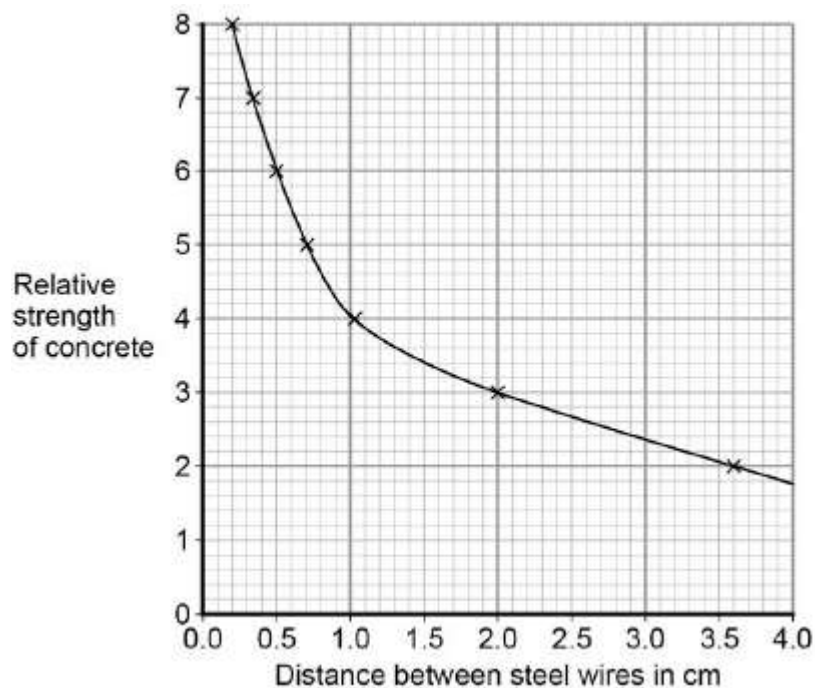


Figure 3 shows how the distance between the steel wires affects the relative strength of the concrete.

Figure 3



Use values from **Figure 3** to describe the relationship shown by the graph.

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(2)
(Total 6 marks)

Q3. All life on Earth depends on water.

The figure below shows an iceberg floating on the sea.



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- (a) Explain how the water molecules in the iceberg could end up as water in a lake.

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(4)

- (b) Rainwater collects in rivers and lakes.

Water in rivers and lakes contains materials that make the water unsafe to drink.

Describe how the water from rivers and lakes is treated to make it safe to drink.

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(4)
(Total 8 marks)

Q4. Where copper ore has been mined there are areas of land that contain very low percentages of copper compounds.

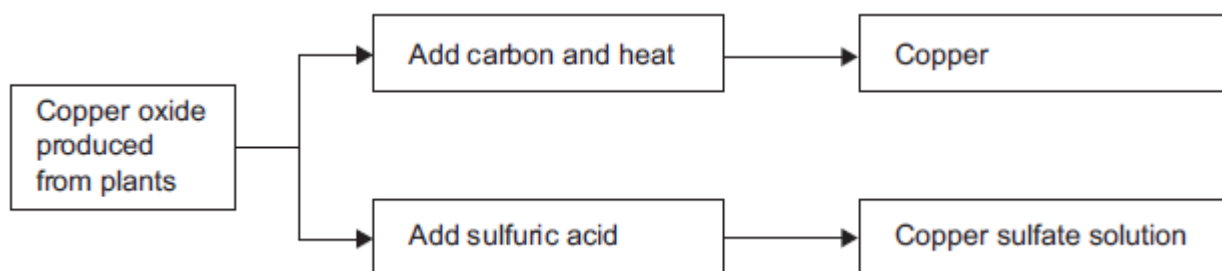
One way to extract the copper is to grow plants on the land.

The plants absorb copper compounds through their roots.

The plants are burned to produce copper oxide.

The copper oxide produced from plants can be reacted to produce copper or copper sulfate solution, as shown in **Figure 1**.

Figure 1



(a) (i) Complete the sentence.

Using plants to extract metals is called

(1)

(ii) Suggest **two** reasons why copper from these areas of land is **not** extracted by smelting.

.....

(2)

(iii) Complete and balance the chemical equation for the reaction of copper oxide with carbon.



(2)

- (b) Copper is produced from copper sulfate solution by displacement using scrap iron or by electrolysis.

- (i) Use the Chemistry Data Sheet to help you to answer this question.

Give **two** reasons why scrap iron is used to displace copper.

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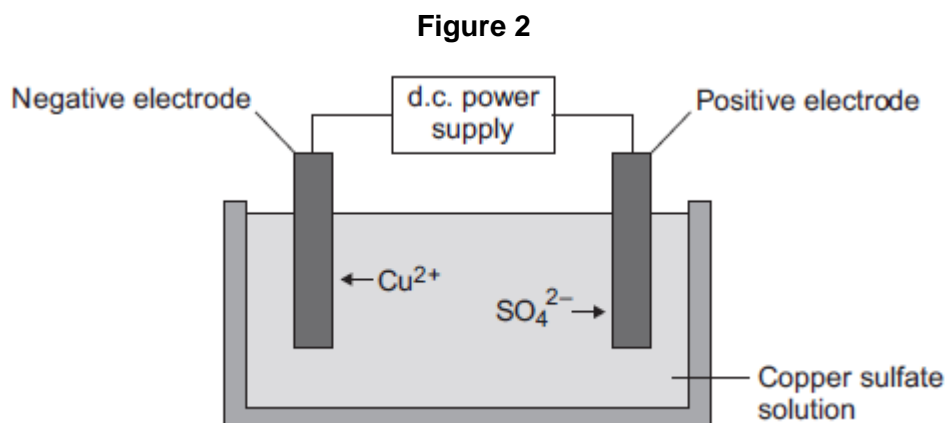
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(2)

- (ii) **Figure 2** shows the electrolysis of copper sulfate solution.



Describe what happens to the copper ions during electrolysis.

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(2)

(Total 9 marks)

Q5. Water in Britain is taken from reservoirs to use as drinking water.



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- (a) What are the **two** main steps used to treat water from reservoirs?

Give **one** reason for each step.

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(4)

- (b) Some people use water filters to treat water before drinking it.

- (i) Water filters remove hardness from hard water.

What is in water filters that removes hardness from water?

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(1)

- (ii) Suggest why water filters used in the home contain particles of silver.

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(1)

- (c) Pure water can be produced by distillation.

Why is distillation **not** usually an economic method of treating water for drinking?

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(1)

- (d) Drinking hard water has health benefits.

State **one** health benefit of drinking hard water.

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(1)

(Total 8 marks)

Q6.Most water contains dissolved compounds.

The concentrations of these dissolved compounds are higher in sea water than in drinking water.

- (a) (i) Draw a ring around the correct answer to complete the sentence.

Pure water can be obtained from sea water by

distillation.
filtration.
neutralisation.

(1)

- (ii) What is the boiling point of pure water? °C

(1)

- (b) A student wanted to find out how much solid was dissolved in sea water.

This is the method the student used:

- measure the mass of an empty evaporating basin
- measure 25 cm³ of sea water and pour it into the evaporating basin
- heat the evaporating basin gently until all of the water has evaporated
- measure the mass of the evaporating basin containing the solid residue.

- (i) What piece of apparatus would be suitable for measuring 25 cm³ of sea water?

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(1)

- (ii) How could the student check that all of the water had evaporated?

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(2)

- (iii) The results the student obtained using 25 cm³ of sea water are:

mass of empty evaporating basin = 23.21 g

mass of evaporating basin and dry solid residue = 24.04 g

Calculate the mass of solid dissolved in 1000 cm³ of the sea water.

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Mass dissolved in 1000 cm³ = g

(2)

- (c) In many countries chlorine is added to drinking water supplies.

Why is chlorine added to drinking water?

(1)

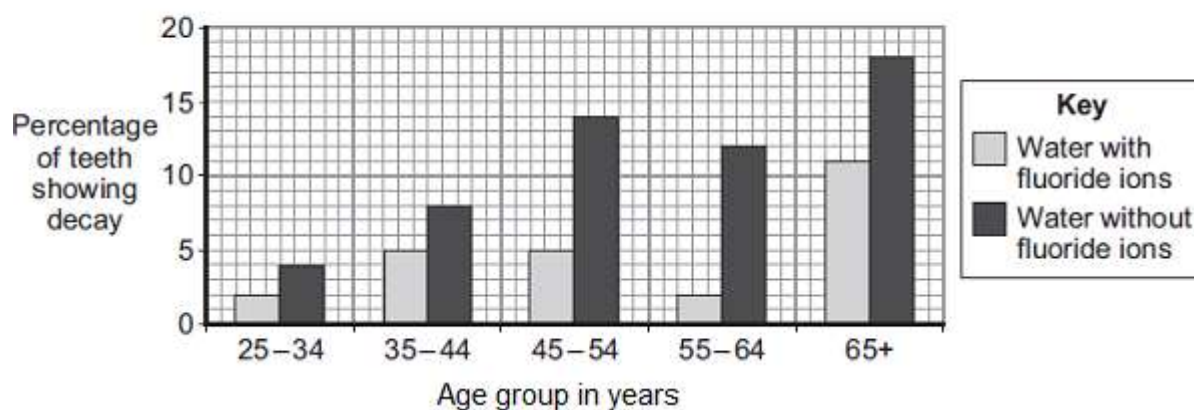
- (d) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Compounds containing fluoride ions are added to some drinking water supplies.

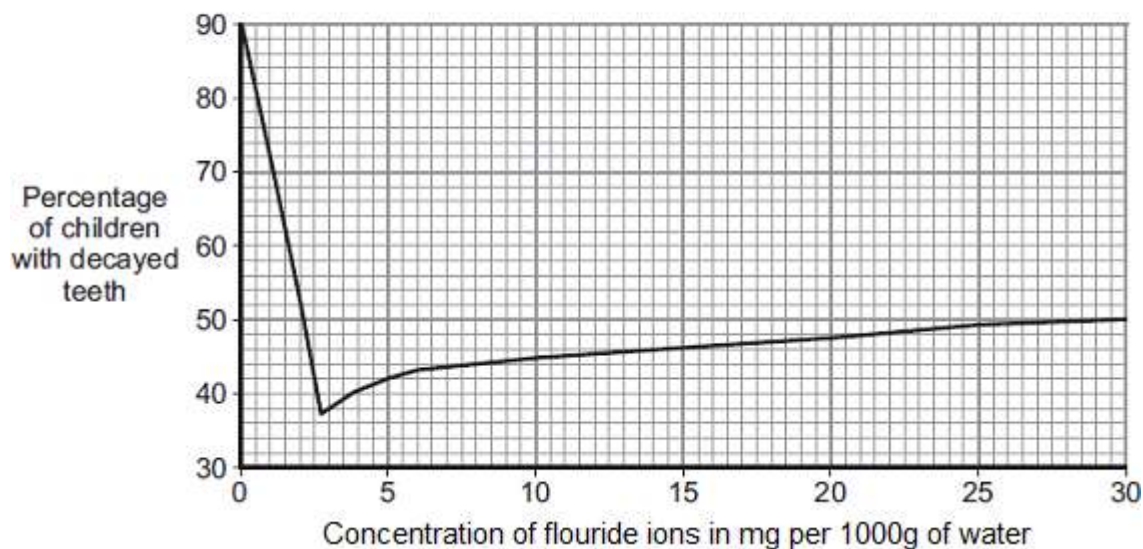
Many scientists have done research into the effects of fluoride ions in drinking water.

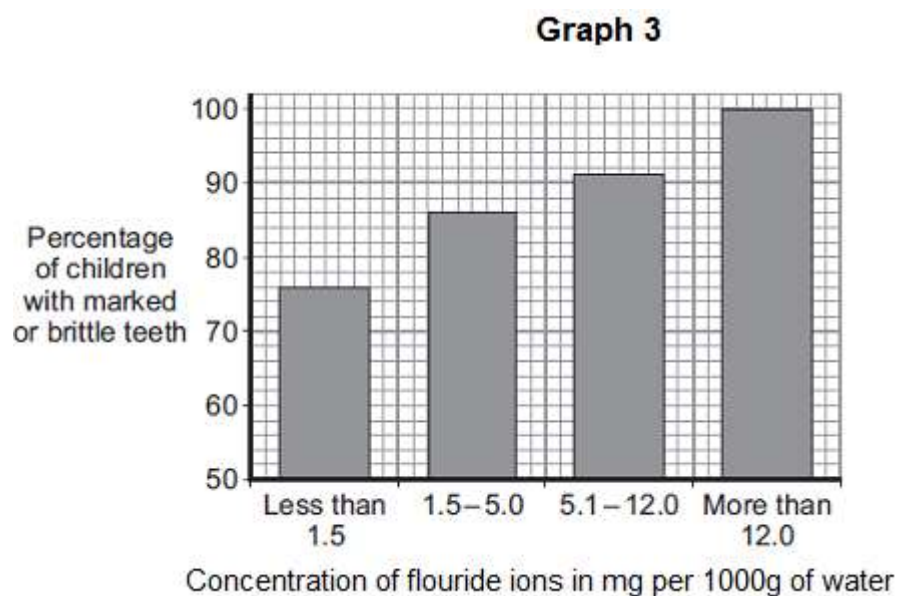
Graphs 1, 2 and 3 show some of the results obtained.

Graph 1



Graph 2





Evaluate the advantages and disadvantages of adding fluoride ions to drinking water.

You should support your answer with evidence from **all three** graphs.

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(6)
(Total 14 marks)