1. Potable water is water that is safe to drink.

Seawater can be changed into potable water by desalination.

(a) Name the substance removed from seawater by desalination.

_____

(1)

(b) Desalination requires large amounts of energy.

Desalination is only used when there is no other source of potable water.

Give **one** reason why.

_____

_____

(1)

Water from lakes and rivers can be treated to make it potable.

(c) The first stage is to filter the water from lakes and rivers.

Why is the water filtered?

_____

_____

(1)

(d) Chlorine gas is then added to the filtered water.

Why is chlorine gas used to treat water?

_____

_____

(1)

(e) Describe a test for chlorine gas.

Give the result of the test if chlorine is present.

Test _____

Result _____

(2)

Some students investigated different water samples.

The table shows some of their results.

Water	**pH**	**Mass of dissolved solid in g / dm^3**
Tap water	6.5	0.5
Seawater	8.1	35.0
Pure water		

(f) Complete the table above to show the expected results for pure water.

(2)

(g) What mass of dissolved solid is present in 100 cm^3 of the sample of tap water?

Tick (✓) **one** box.

0.05 g ☐

0.5 g ☐

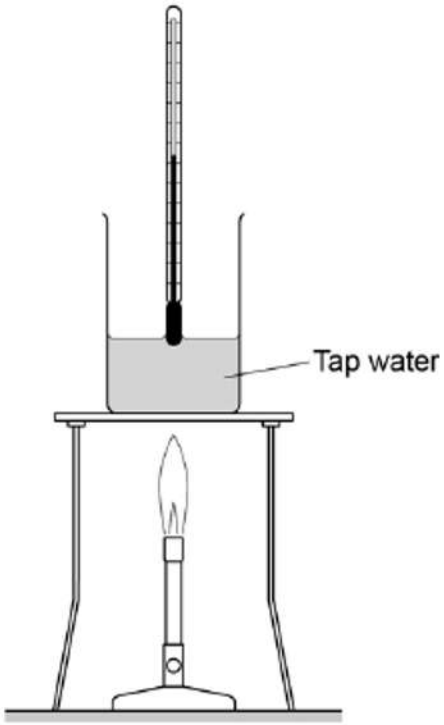
5 g ☐

50 g ☐

(1)

(h) Boiling points can be used to show whether substances are pure.

The diagram shows the apparatus the students used to find the boiling point of tap water.



The students made a mistake setting up the apparatus.

What mistake did the students make?

_____

_____

(1)

(Total 10 marks)

2. Water from a lake in the UK is used to produce drinking water.

(a) What are the two main steps used to treat water from lakes?

Give a reason for each step.

Step 1 _____

Reason _____

Step 2 _____

Reason _____

(2)

(b) Explain why it is more difficult to produce drinking water from waste water than from water in lakes.

_____

_____

_____

_____

_____

_____

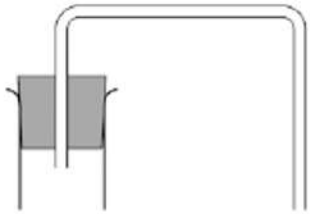
(3)

(c) Some countries make drinking water from sea water.

Complete the figure below to show how you can distil salt solution to produce and collect pure water.

Label the following:

- pure water
- salt solution



(3)

(d) How could the water be tested to show it is pure?

Give the expected result of the test for pure water.

_____

_____

_____

_____

_____

(2)

(e) Why is producing drinking water from sea water expensive?

_____

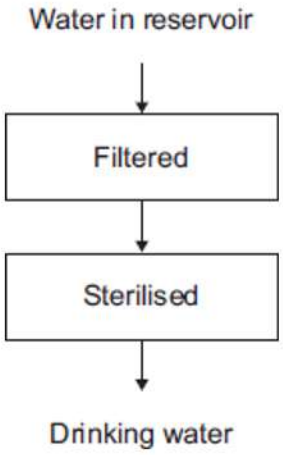
_____

(1)

(Total 11 marks)

3. This question is about drinking water.

(a) The flow diagram below shows how water is made suitable for drinking.



(i) What is removed when the water is filtered?

Tick (✓) **one** box.

Gases ☐

Liquids ☐

Solids ☐

(1)

(ii) What is used to sterilise the water?

Tick (✓) **one** box.

Carbon ☐

Chlorine ☐

Sodium chloride ☐

(1)

(iii) Why is the water sterilised?

_____

_____

(1)

(b) Water can be purified by distillation.

Drinking water is **not** usually purified by distillation because distillation is expensive.

Complete the sentence.

Distillation is expensive because it requires a lot of

_____

(1)

(c) Why do some water companies add fluoride to drinking water?

_____

_____

(1)

(Total 5 marks)

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

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

Give **one** reason for each step.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(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?

_____

_____

(1)

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

_____

_____

(1)

(c) Pure water can be produced by distillation.

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

_____

_____

(1)

(d) Drinking hard water has health benefits.

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

_____

_____

(1)

(Total 8 marks)

5. 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 cm^3 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 cm^3 of sea water?

_____

(1)

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

_____

_____

_____

_____

(2)

(iii) The results the student obtained using 25 cm^3 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 cm^3 of the sea water.

_____

_____

_____

Mass dissolved in 1000 cm^3 = _____ g

(2)

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

Why is chlorine added to drinking water?

_____

_____

(1)

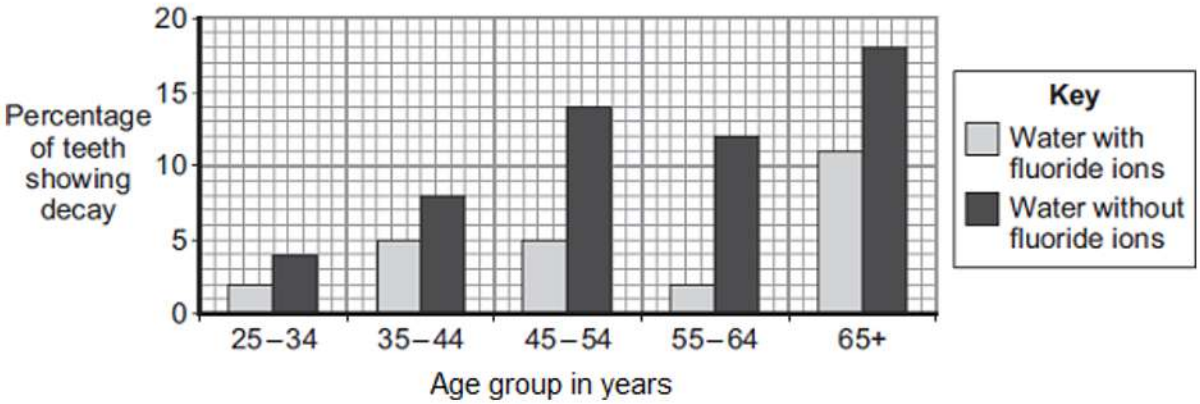
(d) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

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

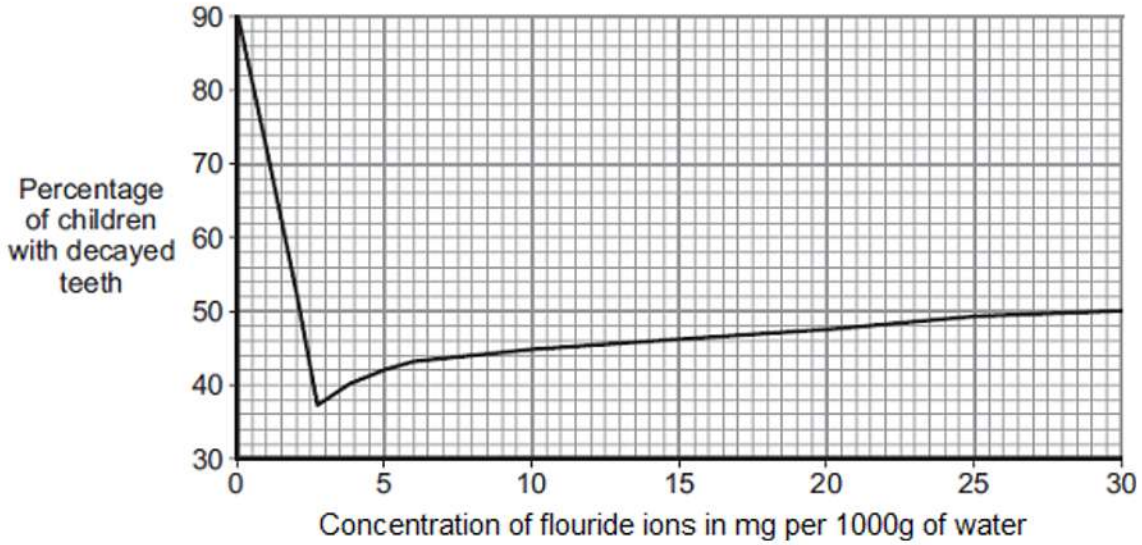
Many scientists have done research into the effects of fluoride ions in drinking water.

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

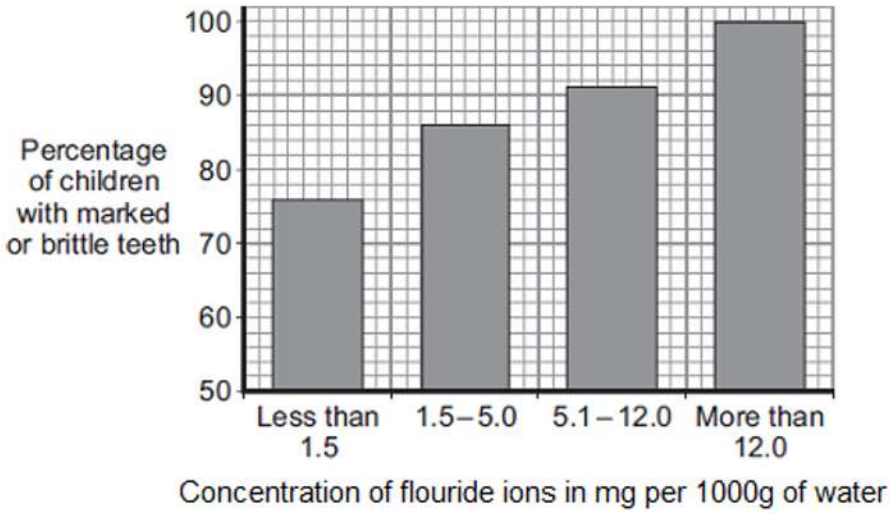
Graph 1



Graph 2



Graph 3



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

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

(6)

(Total 14 marks)

6. Read the following information and then answer the questions.

Chlorine – for better, for worse?

Chlorine is used to make bleaches, plastics and medicines. Swimming pool water is often treated with chlorine.

Chlorine is used to make water safe to drink. It is relatively cheap and easy to use. People who drink untreated water risk dying from typhoid and cholera.

However, chlorine is a poisonous chemical. It causes breathing difficulties and can kill people. Some people are also allergic to chlorine.

(a) How does chlorine make water safe to drink?

_____

_____

(1)

(b) The amount of chlorine in swimming pool water should be carefully monitored and controlled.

Explain why.

_____

_____

_____

_____

(2)

(c) Developing countries are likely to choose chlorination as their method of making water safe to drink.

Suggest why.

_____

_____

_____ **(1)**

(d) A government is setting up an enquiry into the safety of using chlorine.

(i) Suggest why people from all political parties should be represented.

_____

_____

_____ **(1)**

(ii) Suggest why the opinion of a well-respected scientist might change the outcome of any discussion.

_____

_____

_____ **(1)**

(iii) The decision taken about the safety of using chlorine should be based on evidence and data rather than on hearsay and opinion.

Suggest why.

_____

_____

_____ **(1)**

(Total 7 marks)