

**Hard and soft water and purifying water**

1. (a) In some parts of the world the water is hard, but in other parts the water is soft.

Draw a ring around the correct answer to complete these sentences.

(i)

When water comes into contact with rocks, ions 

condense
dissolve
evaporate

 into the water.

(1)

(ii)

Hardness in water is caused by 

calcium
hydrogen
sodium

 ions.

(1)

(iii)

Hard water can be made soft by adding 

sodium carbonate.
sodium chloride.
sodium sulfate.

(1)

(iv) The ions that cause hardness are removed by adding a substance

which 

neutralises
oxidises
precipitates

 them .

(1)

(b) Hard water reduces the efficiency of kettles.

The picture shows a heating element from a kettle.



Explain how hard water reduces the efficiency of kettles.

.....

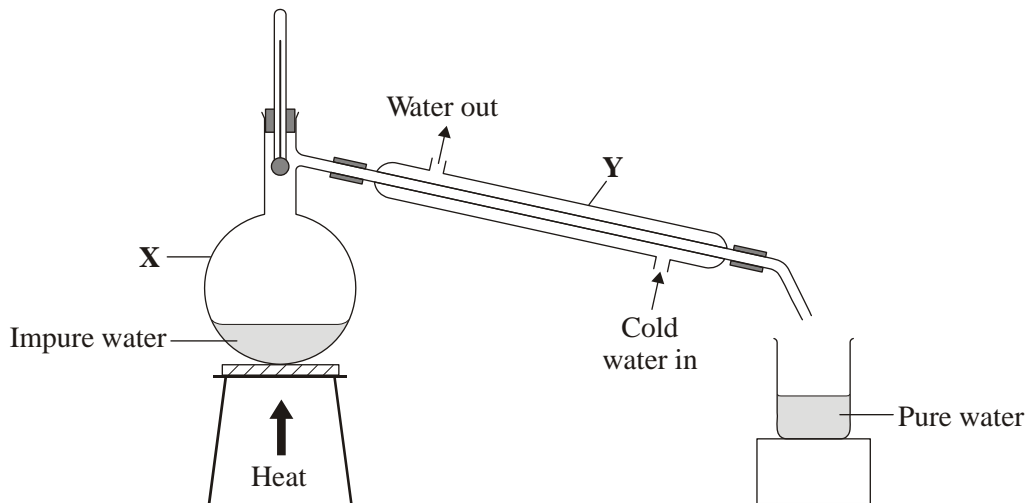
.....

.....

.....

(2)

(c) The diagram shows how pure water can be made from impure water by distillation.



Choose the correct words from the box to name apparatus X and Y.

beaker	condenser	flask	thermometer
--------	-----------	-------	-------------

(i) Apparatus X is a .....

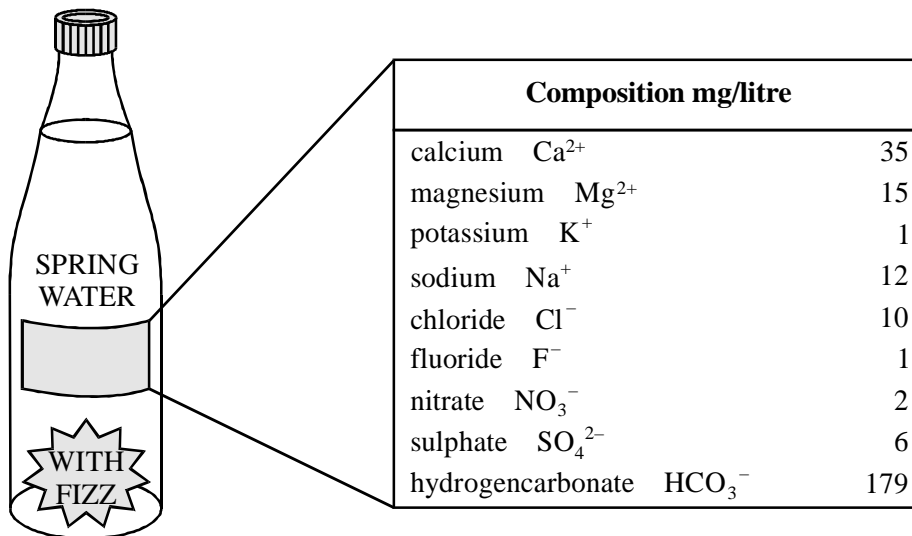
(1)

(ii) Apparatus Y is a .....

(1)

(Total 8 marks)

2. The label shows the ions present in the bottle of spring water. This water is *temporarily* hard.



(a) Name the compound that would be present in the greatest amount if this water were evaporated to dryness.

..... (2)

(b) (i) What is hard water?

..... (2)

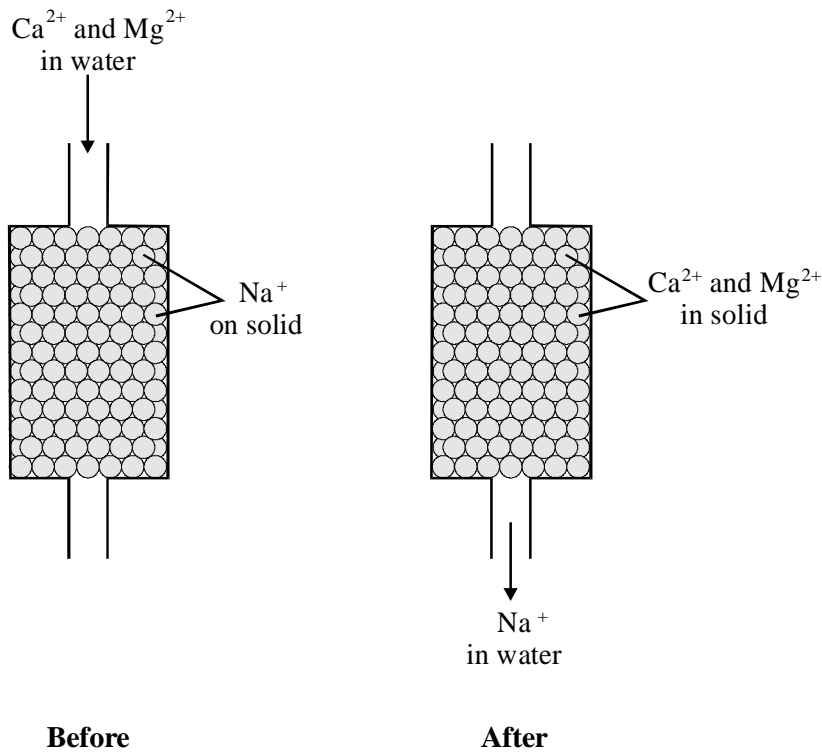
(ii) State one advantage of hard water.

..... (1)

(c) Describe an experiment that would show that this water is *temporarily* hard.

..... (4)

(d) This hard water may be softened as shown.



What name is given to this process?

.....

(1)  
(Total 10 marks)

3. Good quality water is needed for a healthy life.

In the United Kingdom, obtaining safe water for drinking is as simple as turning on a tap. The water is made safe to drink by water companies.

However, in many parts of Africa and Asia, water used for drinking is contaminated and untreated. It is estimated that 2.2 million people die each year as a result of drinking contaminated water.



DADA DANESHANANDA, Man with filtered water from the Mafi-Zongo water project. [www.amurt.net/africa/ghana/2005](http://www.amurt.net/africa/ghana/2005)

Unit C3, C3.2.1 & C3.2.2

- (a) Sea water is **not** used as drinking water.  
Suggest why.

.....  
.....

(1)

- (b) Explain why water for drinking is filtered and then treated with chlorine.

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

(2)

(Total 3 marks)