

Water

Question paper

Level	GCSE
Subject	Chemistry
Exam Board	CCEA
Topic	Water
Sub-Topic	Water
Booklet	Question paper

Time Allowed: 33 minutes

Score: /27

Percentage: /100

FOUNDATION TIER

- 1 (a) The first national report examining the impact of water fluoridation on children was published in 2014. The dental health of five year olds and twelve year olds living in fluoridated water and non-fluoridated water areas was measured.

Data from this report is shown in the table below.

	In fluoridated water areas	In non-fluoridated water areas
% of twelve year olds with tooth decay	22	37
% of five year olds with tooth decay	13	42
% of hospital admissions for children aged 1–4 for tooth decay	2	20

- (i) Use the data in the table to deduce the effect, if any, of the presence of fluoride in water on the dental health of children.

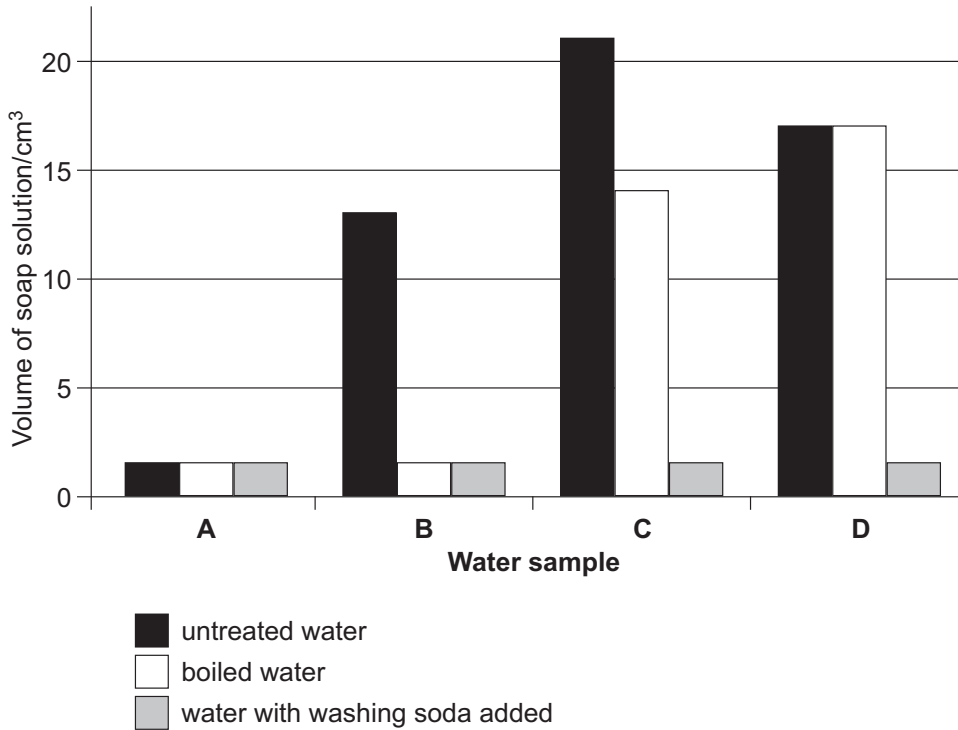
[2]

- (ii) State one reason why some people are against the fluoridation of drinking water.

[1]

- (b) Four samples of water, A, B, C and D, were tested for hardness. Soap solution was added, with shaking, to each of the four 20.0 cm³ samples of water. The volume of soap solution required to produce 1 cm height of lather was recorded.

The experiment was repeated, with fresh boiled samples of water and then again with fresh samples of water which had been treated with washing soda. The results of the experiment are shown below.



- (i) What is meant by the term hard water?

[1]

- (ii) Which one of the samples, A, B, C or D is the hardest water? Explain your answer.

Sample: _____

[2]

(iii) What type of hardness is present in the following samples?

Sample B _____

Sample D _____

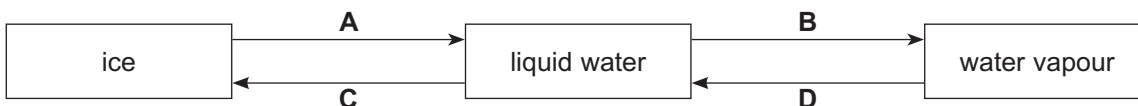
[2]

(iv) Explain why hard water is considered to be good for your health.

 _____ [1]

(c) Water can exist in three different states of matter.

(i) The changes of state are represented by the letters A, B, C and D, in the diagram below.



Complete the table below giving the name of the change of state represented by each letter.

Change of state	Name of the change of state
A	
B	
C	
D	

[4]

(ii) Name a chemical which could be used to test for the presence of water.

_____ [1]

- 2 (a) Fill in the blanks in the following sentences about water.

Water is a colourless liquid at room temperature and pressure and has a melting point of 0°C and a boiling point of _____ $^{\circ}\text{C}$.

One test for water is to use cobalt(II) chloride paper which changes colour from _____ to _____ if water is present. [3]

- (b) An investigation was carried out to compare the hardness of water samples from three towns A, B and C.

25cm^3 of each water sample were placed into three separate conical flasks and labelled A, B and C. A sample of deionised water was also tested.

Soap solution was added 1cm^3 at a time to each conical flask with shaking until a lasting lather formed. The total volume of soap solution added to each flask was recorded.

The experiment was repeated with fresh samples of A, B and C which had been boiled and allowed to cool, before adding the soap solution.

The results are shown in the table below.

Water sample	Volume of soap solution required to form a lather	
	before boiling (cm^3)	after boiling (cm^3)
Deionised water	2	2
A	6	6
B	8	2
C	11	7

Examiner Only	
Marks	Remark

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HIGHER TIER

- 3 (a) An investigation was carried out to compare the hardness of water samples from three towns A, B and C.

25 cm³ of each water sample were placed into three separate conical flasks and labelled A, B and C. A sample of deionised water was also tested.

Soap solution was added, 1 cm³ at a time, to each conical flask with shaking until a lasting lather formed. The total volume of soap solution added to each flask was recorded.

The experiment was repeated with fresh samples of A, B and C which had been boiled and allowed to cool, before adding the soap solution.

The results are shown in the table below.

Water sample	Volume of soap solution required to form a lather	
	before boiling (cm ³)	after boiling (cm ³)
Deionised water	2	2
A	6	6
B	8	2
C	11	7

- (i) Which of the three water samples (A, B or C) is the hardest water?

_____ [1]

- (ii) Which of the three water samples (A, B or C) contains **only** temporary hardness?

_____ [1]

- (iii) Which of the three water samples (A, B or C) contains both temporary and permanent hardness?

_____ [1]

Examiner Only	
Marks	Remark

