

Potable water and water treatment (required practical)

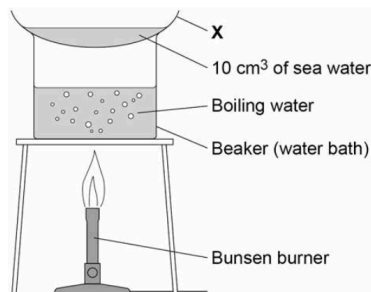
Q1. (2018)

0 3

A student tested a sea water sample for dissolved solids.

Figure 6 shows the apparatus.

Figure 6



A)

0 3 . 1

What is apparatus X on Figure 6?

[1 mark]

Tick **one** box.

Boiling tube

☐

Condenser

☐

Funnel

☐

Watch glass

☐

B)

0 3 . 2

The student did the test four times.

The student calculated the mass of solid on apparatus X after heating.

Table 3 shows the student's results.

Table 3

	Test 1	Test 2	Test 3	Test 4
Mass of solid in grams	0.12	0.29	0.14	0.15

Calculate the mean mass of solid.

Do not include the anomalous result in your calculation.

Give your answer to 2 significant figures.

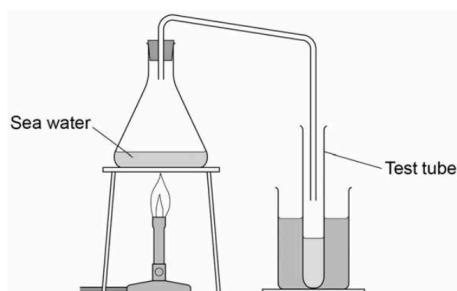
[3 marks]

Mean mass = _____ g

C)

The student distilled a sample of sea water in the apparatus shown in **Figure 7**

Figure 7



- 0 3 . 3 What change of state is happening at the surface of the sea water in **Figure 7**? [1 mark]

D)

- 0 3 . 4 Describe how the water in the test tube in **Figure 7** is different from the sea water. [1 mark]

Q2. (2018)

- 0 3 . 5 Why does producing drinking water from sea water using distillation cost a lot of money? [1 mark]

Q3. (2018)

- 0 3 . 6 River water is filtered then sterilised to make drinking water.
Why are these **two** processes done? [2 marks]

Filtrating _____

Sterilising _____

Q4. (2019)

- 0 6 . 1 What do we call water that is safe to drink? [1 mark]
- Tick (✓) **one** box.

Desalinated ☐

Filtered ☐

Fresh ☐

Potable ☐

Q5. (2019)

- 0 6 . 3 Describe a method to determine the mass of dissolved solids in a 100 cm³ sample of river water. [4 marks]

Q6. (2019)

06.4

A sample of river water contains 125 mg per dm^3 of dissolved solids.

Calculate the mass of dissolved solids in grams in 250 cm^3 of this sample of river water.

Give your answer to 2 significant figures.

[4 marks]

Q7. (2019)

06.5

A water company allows a maximum of 500 mg per dm^3 of sulfate ions in drinking water.

A sample of drinking water contains 44 mg per dm^3 of sulfate ions.

Calculate the percentage (%) of the maximum allowed mass of sulfate ions in the sample of drinking water.

[2 marks]

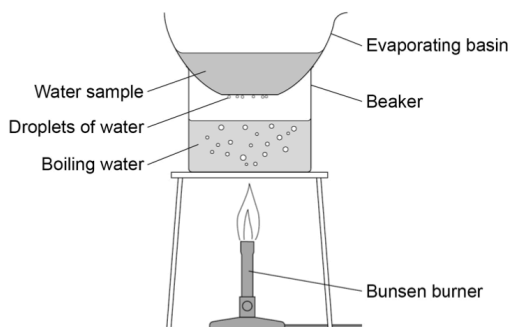
Percentage (%) of the maximum allowed mass = _____ %

Q8. (2020)

03

A student investigated the mass of dissolved solids in water samples.

Figure 4 shows the apparatus used.

Figure 4

This is the method used.

1. Record the mass of a dry evaporating basin.
2. Pour 25 cm^3 of the water sample into the evaporating basin.
3. Place the evaporating basin on the beaker for 10 minutes.
4. Record the mass of the evaporating basin and contents.

A)

0 3 . 1 What is used to find the mass of the evaporating basin?

[1 mark]

Tick (✓) **one** box.

Balance

☐

Beaker

☐

Measuring cylinder

☐

Thermometer

☐

B)

One error is that droplets of water collect on the bottom of the evaporating basin.

0 3 . 2 Suggest how this error affects the mass of the evaporating basin and contents.

[1 mark]

C)

0 3 . 3 How can this error be corrected?

[1 mark]

D)

0 3 . 4 Another error in the method is that not all the water was removed from the water sample.

How can this error be corrected?

[1 mark]

Tick (✓) **one** box.

Add more boiling water to the beaker.

☐

Heat until the mass of the evaporating basin and contents is constant.

☐

Stir the water sample in the evaporating basin with a glass rod.

☐

E)

0 3 . 5 The water in the water sample turns into steam.

What is the name of this process?

[1 mark]

F)

Another student did the experiment correctly with three water samples **A**, **B** and **C**.**Table 2** shows the results.**Table 2**

Water sample	Mass of dissolved solids in g			
	Test 1	Test 2	Test 3	Mean
A	0.23	0.23	0.20	X
B	0.03	0.07	0.02	0.04
C	1.45	1.60	1.45	1.50

0 3 . 6 The range is the difference between the largest value and the smallest value.

Which water sample has the greatest range of results?

[1 mark]

Tick (✓) **one** box.

A ☐

B ☐

C ☐

G)

0 3 . 7 Calculate the mean mass **X** for water sample **A**.

Use **Table 2**.

[2 marks]

X = _____ g

H)

0 3 . 8 What is the dependent variable in this experiment?

[1 mark]

Tick (✓) **one** box.

Mass of dissolved solids

☐

Time taken for water to heat

☐

Type of water sample

☐

Volume of boiling water

☐

I)

0 3 . 9 A different water sample contains 3.6 g of dissolved solids in 150 cm³

Calculate the mass of dissolved solids in 25 cm³ of this sample.

[2 marks]

Mass = _____ g

Q9. (2021)

0 1 . 6 Two processes used to obtain potable water from fresh water are:

- filtering
- sterilising.

Give **one** reason why each process is used.

[2 marks]

Filtrating _____

Sterilising _____

Q10. (2021)

0 1 . 7 Which type of water is the easiest to obtain potable water from?

[1 mark]

Tick (✓) **one** box.

Ground water

☐

Salt water

☐

Waste water

☐

Q11. (2021)

0 1 . 8 Which of the following is the first stage of waste water treatment?

[1 mark]

Tick (✓) **one** box.

Aerobic biological treatment of effluent

☐

Anaerobic digestion of sewage sludge

☐

Screening and removal of grit

☐

Q12. (2022)

0 7 . 1 Water that is safe to drink is called potable water.

Compare how easily potable water can be obtained from:

- waste water (sewage)
- ground water (fresh water).

[6 marks]

Q13. (2022)

A)

A scientist produced potable water from 150 cm³ of salty water.

0 7 . 2 Which process can be used to produce potable water from salty water?

[1 mark]

Tick (✓) **one** box.

Distillation

☐

Electrolysis

☐

Filtration

☐

Sterilisation

☐

B)

0 7 . 3 The salty water contains sodium chloride.

The scientist collected 2.40 g of sodium chloride from 150 cm³ of salty water.

Calculate the concentration of sodium chloride in grams per dm³

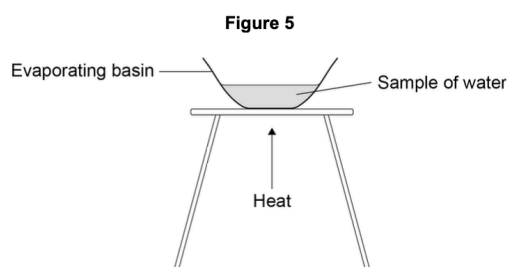
[3 marks]

Concentration of sodium chloride = _____ g/dm³

Q14. (2023)

A student investigated the mass of dissolved solids in distilled water and in sea water.

Figure 5 shows the apparatus.



This is the method used.

1. Weigh an evaporating basin.
2. Add a sample of distilled water to the evaporating basin.
3. Weigh the evaporating basin and the water sample.
4. Heat the water sample.
5. Weigh the evaporating basin and contents.
6. Repeat steps 1 to 5 two more times.
7. Repeat steps 1 to 6 with sea water.

A)

0 3 . 1 Give **one** safety precaution the student should take.

[1 mark]

B)

0 3 . 2 The method used did **not** give valid results.Which **two** improvements could the student make to give valid results?

[2 marks]

Tick (✓) **two** boxes.

Heat until the mass of the evaporating basin and contents does not change.

☐

Leave some water in the evaporating basin after heating.

☐

Record the results in a table and plot a bar graph.

☐Use 25 cm³ of water for each experiment.☐

Use a beaker instead of an evaporating basin.

☐

C)

0 3 . 3 A different student used a method which gave valid results.

Table 2 shows the results.

Table 2

Type of water	Mass of dissolved solids in grams		
	Test 1	Test 2	Test 3
Distilled water	0.00	0.00	0.00
Sea water	0.31	0.32	0.27

The student concludes that distilled water is pure.

Suggest **one** reason why.

[1 mark]

Q15. (2023)

Tap water is potable.

One step in producing potable water is sterilisation.

0 3 . 4 Why is potable water sterilised?

[1 mark]

Tick (✓) **one** box.

To improve the taste

☐

To kill bacteria

☐

To remove dissolved solids

☐

Q16. (2023)

03.5

Chlorine is used to sterilise water.

The reaction between chlorine and water is reversible.

Complete the sentence.

[1 mark]

Equilibrium is reached when the forward and reverse reactions
occur at the same _____.

Q17. (2023)

03.6

The test for chlorine uses damp litmus paper.

Complete the sentence.

Choose the answer from the box.

[1 mark]

blue	green	white
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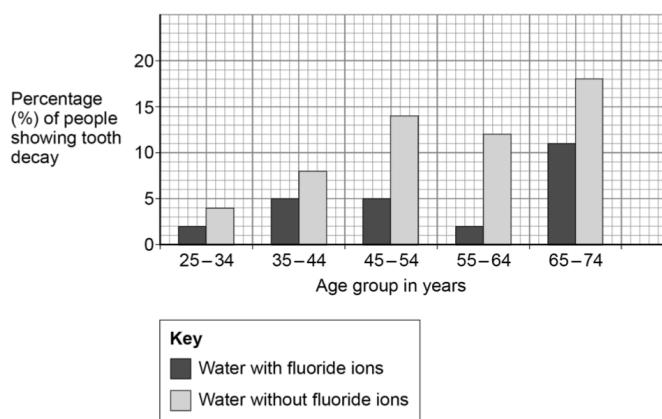
When damp litmus paper is put into chlorine gas
the litmus paper turns _____.

Q18. (2023)

There is evidence that adding fluoride ions to drinking water reduces tooth decay.

Figure 6 shows the percentage of people showing tooth decay.

Figure 6



A)

03.7

Compare the effects of adding fluoride ions to drinking water on tooth decay in people between the ages of 25 and 74.

Use data from Figure 6.

[4 marks]

B)

03.8

Student A says that water companies should add fluoride ions to all drinking water.

Student B disagrees.

Suggest **one** reason why Student B may think that fluoride ions should **not** be added to all drinking water.

[1 mark]

Q19. (2024)

0 4

Tap water must be safe to drink.

0 4 . 1

What name is given to water that is safe to drink?

[1 mark]

Tick (✓) **one** box.

Ground water

☐

Potable water

☐

Waste water

☐

Q20. (2024)

0 4 . 2

Water is sterilised to make the water safe to drink.

Which **two** of the following are used to sterilise drinking water?

[2 marks]

Tick (✓) **two** boxes.

Carbon dioxide

☐

Electrolysis

☐

Filtration

☐

Ozone

☐

Ultraviolet light

☐

Q21. (2024)

A student investigated the mass of dissolved solids in samples of river water, sea water and tap water.

This is the method used.

1. Weigh an evaporating basin.
2. Measure 100 cm³ of river water.
3. Pour the river water into the evaporating basin.
4. Heat the evaporating basin until all the water has evaporated.
5. Weigh the evaporating basin and dissolved solids.
6. Calculate the mass of dissolved solids in the water.
7. Repeat steps 1 to 6 with sea water and then with tap water.

A)

0 4 . 3

Which is the most suitable equipment to measure 100 cm³ of water?

[1 mark]

Tick (✓) **one** box.

Beaker

☐

Conical flask

☐

Measuring cylinder

☐

B)

0 4 . 4 Table 3 shows the results.

Table 3

Type of water	Mass in grams		
	Evaporating basin	Evaporating basin and dissolved solids	Dissolved solids
River	112.1	113.1	1.0
Sea	110.5	114.0	X
Tap	115.3	115.4	0.1

Calculate value X in Table 3.

[1 mark]

X = _____ g

C)

0 4 . 5 Identify the variables used in the investigation.

Draw **one** line from each variable to the example of the variable.

[2 marks]

Variable	Example of variable
Control	Mass of dissolved solids
Dependent	Mass of evaporating basin
	Room temperature
	Type of water
	Volume of water

D)

Table 4 shows the mass of different types of ions dissolved in 1 dm³ of sea water.

Table 4

Type of ion	Mass of type of ion dissolved in 1 dm ³ of sea water in grams
Calcium	0.4
Magnesium	1.3
Sulfate	2.7

0 4 . 6 Complete **Figure 3**.

You should:

- complete the scale for the y-axis
- plot the data from **Table 4** as a bar chart.

[3 marks]

Figure 3

