

Mark schemes



- 1.** (a) sodium chloride
or
salt
allow dissolved salts 1
- (b) expensive 1
- (c) to remove solids 1
- (d) to sterilise the water
allow to kill microorganisms 1
- (e) test: (damp) litmus paper 1
result: bleached
or
turns white 1
- (f) pH: 7.0 1
mass of dissolved solid: 0.0 (g) 1
- (g) 0.05 g 1
- (h) did not immerse the thermometer (bulb) 1
- [10]**
- 2.** (a) filtration
or
by passing through filter beds to remove solids 1
sterilisation to kill microbes
allow chlorine / ozone allow ultraviolet light 1
- (b) water needs more / differe 1



because it contains any **two** from:

- more organic matter
- more microbes
- toxic chemicals or detergents

2

(c) *(as part of glassware attached to bung)*

salt solution in (conical) flask

allow suitable alternative equipment, eg boiling tube

1

(at end of delivery tube)

pure water in test tube which must not be sealed

allow suitable alternative equipment, eg, beaker, condenser

1

heat source (to heat container holding salt solution)

1

*if no other mark obtained allow for 1 mark suitable equipment drawn as part of glassware attached to bung **and** at end of delivery tube*

(d) determine boiling point

1

should be at a fixed temperature 100°C

allow should be 100°C

allow if impure will boil at a temperature over 100°C

1

(e) high energy requirement

1

[11]

3.

(a) (i) Solids

1

(ii) Chlorine

1

(iii) kill microbes / bacteria

allow to make the water safe to drink

ignore disinfect

ignore remove / get rid of microbes

1

(b) energy

allow heat

1

(c) improve dental health

allow reduce tooth decay

allow (local) government requirement

allow help teeth



1

[5]

4.

(a) filter

1



to remove solids **or** *insoluble particles*

OR

add coagulant (1)

flocculation / settling / remove solids (1)

1

(add) chlorine

accept ozone / UV

1

to reduce the number of microbes

accept to kill microbes / bacteria / germs

accept sterilise

allow disinfect

ignore remove microbes

1

(b) (i) ion exchange resin

allow ion exchange column

allow sodium ions / Na⁺

allow hydrogen ions / H⁺

1

(ii) prevent growth of microbes

accept sterilise

accept to kill microbes / bacteria / germs

accept to reduce the number of microbes

ignore remove microbes

1

(c) high cost of energy / *heating*

allow uses a lot of energy

1

(d) any **one** from:

- helps to develop / maintain bones

allow any suitable positive effect on bones

- helps to develop / maintain teeth

allow any suitable positive effect on teeth

- reduces heart disease

1

[8]

5.

(a) (i) distillation

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1

(ii) 100 / one hundred

1



(b) (i) measuring cylinder **or** pipette **or** burette

allow phonetic spelling

*do **not** accept teat pipette*

ignore any additional words or volumes

1

(ii) (re)heat the evaporating basin

*accept heat to constant mass for **2** marks*

1

weigh (again) **or** mass will not change

*if no other mark awarded allow **1** mark for a chemical test for water*

1

(iii) 33.2 (g)

*correct answer with or without working scores **2** marks*

*allow mass of residue = (24.04 g – 23.21 g) = 0.83 for **1** mark*

*allow ecf (mass of residue × 40) for **1** mark*

2

(c) to kill microbes / bacteria **or** to sterilise / disinfect water

allow to prevent disease

ignore 'to make it safe to drink'

1

(d) Marks awarded for this answer will be determined by the Quality of Communication



0 marks

No relevant content

Level 1 (1 – 2 marks)

A simple relevant comment has been made on the data from at least one of the graphs.

Level 2 (3 – 4 marks)

At least two of the graphs have been considered with a relevant comment made.

Level 3 (5 – 6 marks)

All the graphs have been considered and relevant comments made about each. A justified conclusion may be given.

examples of chemistry points made in the response:

extra information

- (graph 1 shows) fluoride ions reduce the amount of tooth decay
- (graph 1 shows) the effect in reducing tooth decay is greatest for 55–64 year olds
accept any in range 55 – 64
- (graph 2 shows) the fluoride ions reduce percentage with decayed teeth
- (graph 2 shows) effect is greatest at 2.5 to 3 mg per 1000 g of water then decay increases if more than 2.5 to 3 mg of fluoride ions per 1000 g water
accept any in range 2.5 – 3
- (graph 2 shows percentage) decay decreases from 0 to 2.5 / 3 mg per 1000 g
- (graph 3 shows) more marked / brittle teeth as fluoride level increases
- above points linked together to draw a justified conclusion

6

[14]

6.

(a) sterilise / disinfect (water)

ignore removes bacteria / impurities / disease

or

kill bacteria / micro-organisms / microbes / germs / pathogens

ignore cleans the water / makes (water) safe

allow destroy bacteria or gets rid of bacteria

1



(b) any **two** from:

ignore reference to safe / unsafe

- chlorine is toxic / poisonous
- so (too much) will be dangerous / harmful / kill people / cause illness / health problems
allow causes damage
- cause breathing difficulties **or** cause (more) allergic reactions / skin **or** eye irritation
- too little will not kill bacteria
allow bacteria still there

2

(c) cheap / easy / quick to use (process)

accept prevents typhoid / cholera

ignore reference to specialists or equipment

1

(d) (i) fair / more ideas / views / opinions **or** less chance of bias **or** more democratic

allow idea of different points of view / balanced view

allow avoids undue influence owtte

1

(ii) (more likely) to have support / influence / convince people

ignore well respected

allow ideas about trust eg people will have more confidence in their views / more likely to be believed

allow ideas about expertise eg more likely to know what they are talking about / have done experiments / tests

allow have knowledge / understanding

allow (more) reliable

1

(iii) (more likely) to be correct / less likely to be incorrect

owtte

or

reliable / factual / accurate / based on proof / based on experiments or tests / based on validation

ignore based on evidence unqualified

allow hearsay / opinion can be biased

1

[7]