New Document 1

Name: _____

Class: _____

Date: _____

Time: **37 minutes**

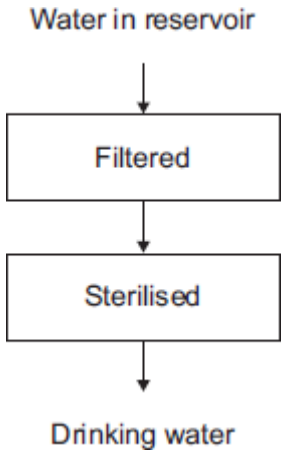
Marks: **35 marks**

Comments:

Q1.

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?

_____

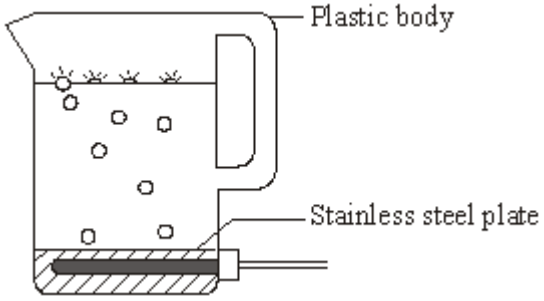
_____

(1)

(Total 5 marks)

Q2.

Plastics are used to make many everyday items, such as the body of the kettle.



(a) Complete the sentences by drawing a ring around the correct words.

(i) The plastic is made from many small molecules called

catalysts
monomers
polymers

(1)

(ii) Propene is produced by cracking some of the fractions that are

separated from

crude oil
limestone
metal ores

(1)

(b) After a few years the kettle no longer worked.

- Some parts of the kettle are made of plastic.
- Some parts of the kettle are made of stainless steel.
- The owner of the kettle disposed of it in a landfill site.

Consider these statements.

Suggest **three** reasons why the kettle should **not** be disposed of in a landfill site.

1. _____

_____

2. _____

_____

3. _____

_____

(3)

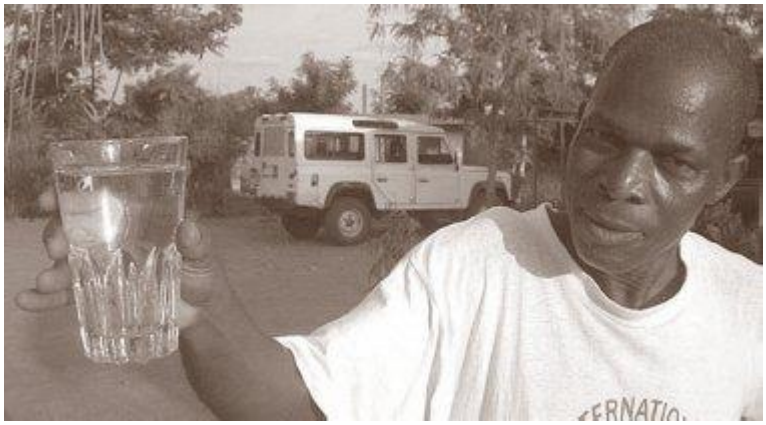
(Total 5 marks)

Q3.

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

(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)

Q4.

This question is about drinking water.

(a) Name **two** methods of treating water from rivers, lakes or the sea to produce drinking water.

Tick **two** boxes.

Anaerobic digestion ☐

Cracking ☐

Desalination ☐

Electrolysis ☐

Sterilising ☐

(2)

(b) The table below shows the amounts of dissolved ions in a sample of drinking water.

Dissolved ion	**Mass in mg per dm^3**
Cl^-	250
Na^+	200
NO_3^+	40

What is the name of the ion with the symbol Cl^-?

Tick **one** box.

Calcium ion ☐

Carbonate ion ☐

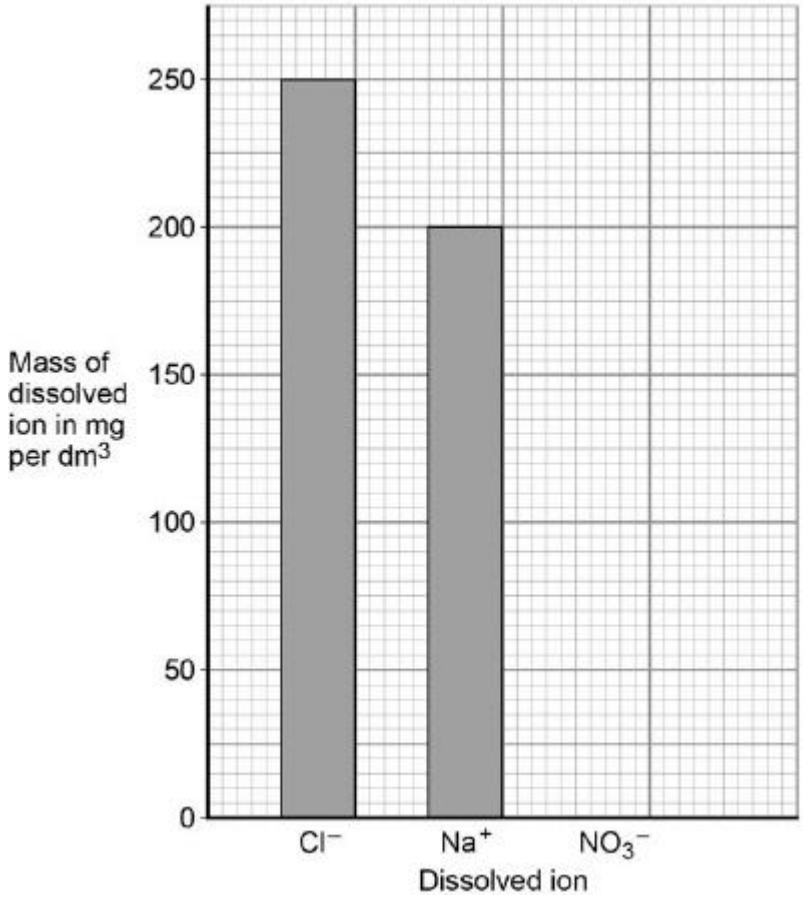
Chloride ion ☐

Chlorine ion ☐

(1)

(c) Use the information in the table above to complete the bar chart in **Figure 1**.

Figure 1



(1)

(d) Look at the questions labelled **A, B, C, D**.

A How many substances are there in drinking water?

B How much fluoride is in drinking water?

C Is fluoride soluble in drinking water?

D Should fluoride be added to drinking water?

Which **one** of the questions cannot be answered by science alone?

Tick **one** box.

A		**B**		**C**		**D**	

(1)

(e) Give **two** reasons why the answer you have chosen cannot be answered by science

alone.

1. _____

_____

2. _____

_____

(2)

(f) A sample of drinking water contains 1.5 mg of fluoride per dm^3 of water.
A person drinks 1 dm^3 of this water.

The recommended daily amount of fluoride is 4.0 mg.

Which calculation gives the percentage of the recommended daily amount of fluoride in 1 dm^3 of this water?

Tick **one** box.

$\frac{1.5}{4.0} \times 100$ ☐

$\frac{1.5}{100} \times 4.0$ ☐

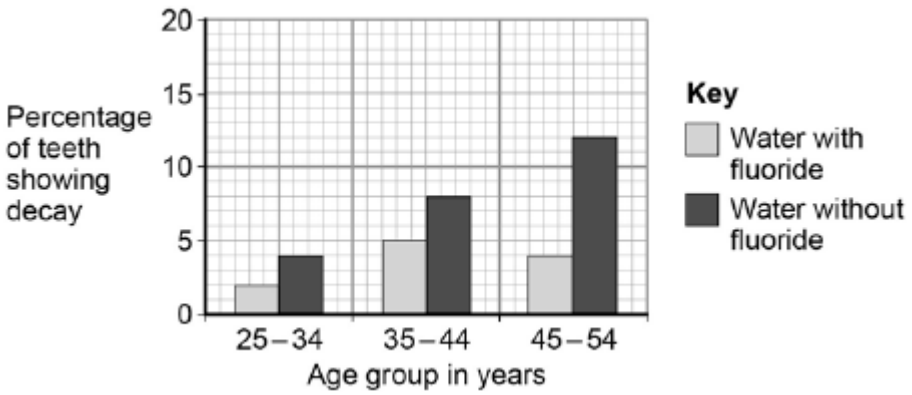
$\frac{4.0}{1.5} \times 100$ ☐

$\frac{100}{1.5} \times 4.0$ ☐

(1)

(g) **Figure 2** shows the effect of fluoride in drinking water on tooth decay in different age groups.

Figure 2



Describe the pattern of tooth decay in **Figure 2** for water without fluoride.

Use data to justify your answer.

_____

_____

_____

_____

(2)

(h) Describe the effect of adding fluoride to drinking water for the age groups in **Figure 2**.

_____

_____

_____

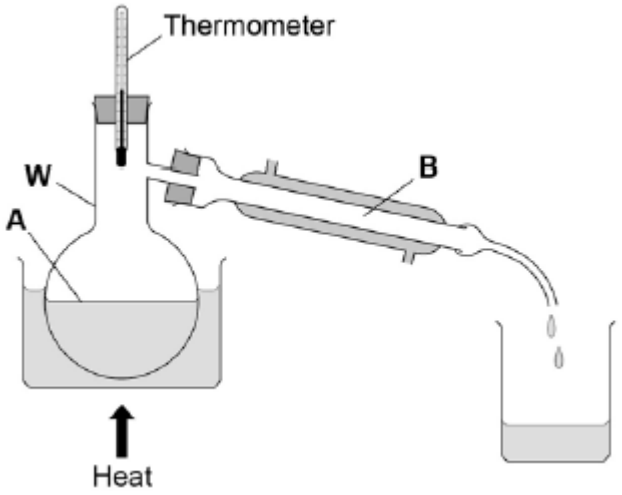
_____

(2)

(Total 12 marks)

Q5.

The apparatus in the figure below is used to separate a mixture of liquids in a fuel.



(a) What is apparatus **W** on above the figure above?

Tick **one** box.

Beaker ☐

Boiling Tube ☐

Flask ☐

Jug ☐

(1)

(b) What is the name of this method of separation?

Tick **one** box.

Crystallisation ☐

Electrolysis ☐

Filtration ☐

Distillation ☐

(1)

(c) Name the changes of state taking place at **A** and **B** in the figure above.

Use words from the box.

boiling	**condensing**	**freezing**	**melting**

Change of state at **A**: _____

Change of state at **B**: _____

(2)

(d) **Table 1** shows the boiling points of the hydrocarbons in the fuel.

Table 1

Hydrocarbon	**Boiling point in °C**
Pentane	36
Hexane	69
Heptane	98
Octane	125

Which hydrocarbon will be the last to collect in the beaker?

Tick **one** box.

Pentane ☐

Hexane ☐

Heptane ☐

Octane ☐

(1)

(e) The fuel is a mixture of liquids that has been designed as a useful product.

What name is given to this type of mixture?

Tick **one** box.

Catalyst ☐

Formulation ☐

Polymer ☐

Solvent ☐

(1)

(f) Describe how this fuel is different from crude oil.

_____

_____

_____

_____

(2)

(g) A student measured the melting point of a solid hydrocarbon four times.

The student's results are in **Table 2**.

Table 2

	Trial 1	**Trial 2**	**Trial 3**	**Trial 4**
Melting point in °C	35	48	37	37

Calculate the mean melting point of the hydrocarbon, leaving out any anomalous result.

Give your answer to two significant figures.

_____

_____

Mean melting point = _____ °C

(2)

(Total 10 marks)

Mark schemes

Q1.

(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]

Q2.

(a) (i) monomers

1

(ii) crude oil

1

(b) any **three** from:

- metal may not corrode away / remains
- plastic remains / does not break down (decay) / not affected by microorganisms

  accept non-biodegradable
- should recycle / conserve resources / mend the kettle / burn (plastic) as a fuel

  accept it is a waste of materials / resources
- landfill sites are limited / filling up
- water pollution

  *ignore harms wildlife / habitats **or** problems caused by burning the kettle*

3

[5]

Q3.

(a) contains (large amounts of) dissolved solids / difficult to remove dissolved solids

allow salty / too much salt
allow sea water makes you thirsty / vomit
allow polluted / untreated / contaminated

1

(b) filtered: removes solids / removes insoluble material / dirt
ignore large objects

1

chlorine: kills/destroy bacteria/microbes/ germs etc
*allow disinfect / sterilise **or** gets rid of bacteria*
ignore purify / clean

1

[3]

Q4.

(a) Desalination

1

Sterilising

1

(b) Chloride ion

1

(c) correct bar for NO_3^-

1

(d) **D**

1

(e) any **two** from:
- people have the right to choose (opinion)
- ethical / moral question
- cannot be tested by experiment

2

(f) $\frac{1.5}{4.0} \times 100$

1

(g) the percentage tooth decay increases with age

1

by 4 % for each increasing age group

1

(h) reduces tooth decay (for all age groups)

1

greater reduction in older people

1

[12]

Q5.

(a) Flask

1

(b) Fractional distillation

1

(c) **A** – boiling

in this order

1

B – condensing

1

(d) Pentane

1

(e) Formulation

1

(f) the fuel is a pure compound

1

and crude oil is a mixture

or

the fuel is made up of four hydrocarbons

allow crude oil contains a large number of compounds and the fuel contains four

and crude oil could have many more

1

(g) (35 + 37 + 37 / 3) = 36.33

1

36

1

*allow (35 + 48 + 37 + 37 / 4 =) 39(.25) for **1** mark*

[10]