Core 1

Use

(a) State **two** uses of water in the home.

1. .....

2. .....[2]

(b) State the boiling point of pure water.

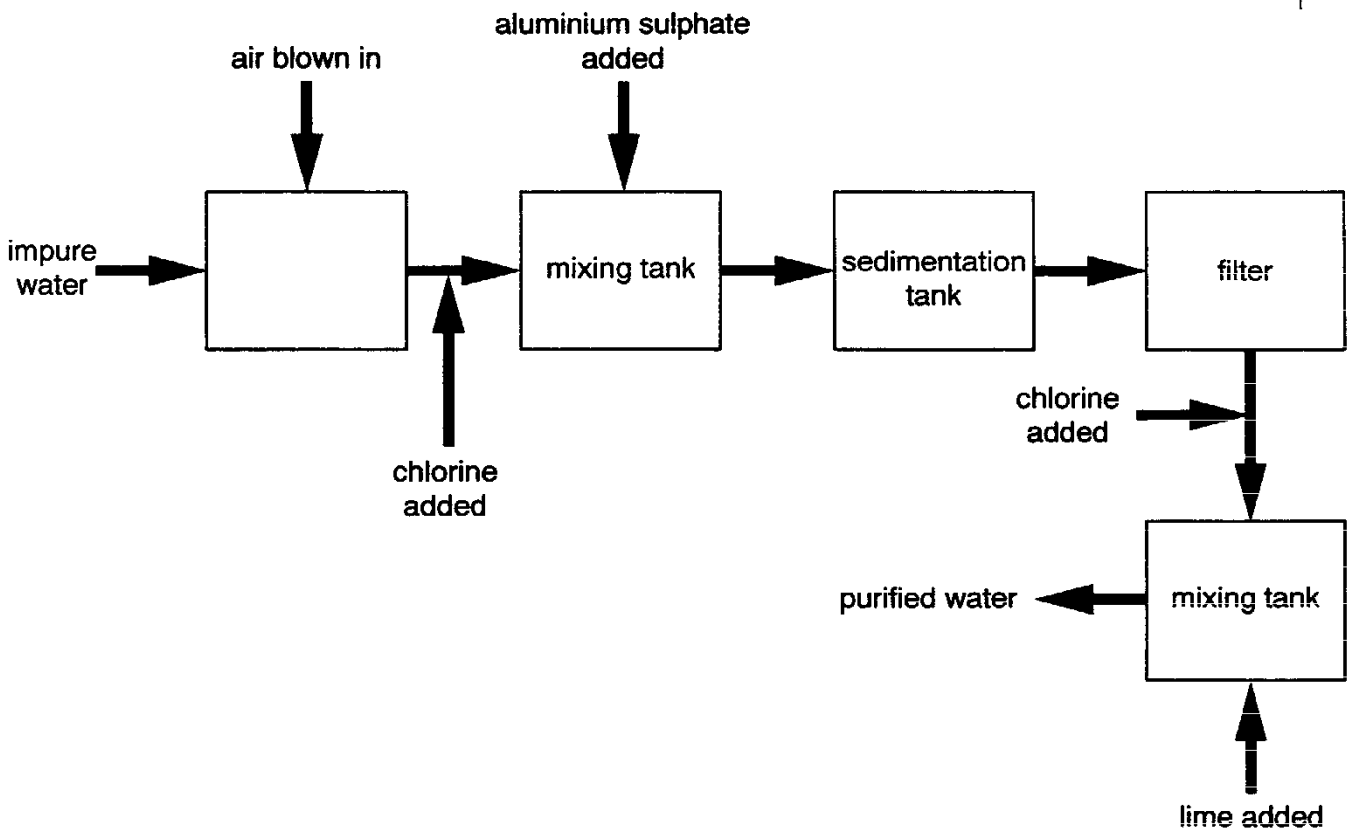
.....[2]

(c) Describe a **chemical** test for water.

Test .....

Result .....[2]

The flow chart shows the stages in water purification.



(d) Air is blown into impure water to help remove dissolved iron compounds.

(i) How could you test for iron(III) ions in the water?

Test .....

Result .....[2]

(ii) Which **two** gases make up most of the air?

..... and .....[2]

(e) When chlorine is added during the water purification process, the water becomes acidic.

(i) Why is chlorine added during the water purification process?

.....[1]

(ii) Suggest why lime is added after chlorination.

.....

.....[2]

(f) The filter consists of a mixture of sand and stones.

Suggest how the filter helps purify the water.

.....

.....

.....

.....[3]

The gas inside the bulb is a mixture of argon and nitrogen.

(i) Explain why argon is used in light bulbs.

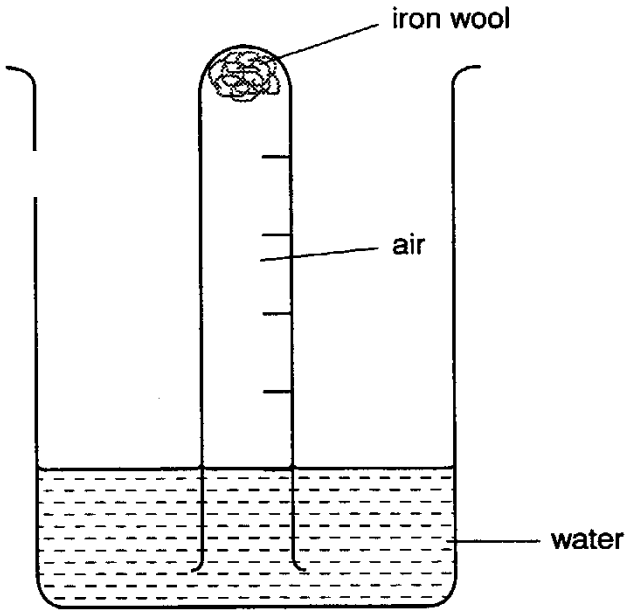
.....[1]

(ii) Suggest a gas which could replace either argon or nitrogen in the light bulb.

.....[1]

Alternative to practical 1

A student set up the experiment below to investigate the effect of water and air on iron wool.



(a) Describe the appearance of the iron after 1 week.

.....[1]

(b) Predict the level of the water in the tube after 1 week. Explain your prediction.

level of water .....

explanation .....

.....[2]

(c) Suggest what would happen if the air in the tube after 1 week was tested with a lighted splint. Explain your suggestion.

result of test .....

explanation .....

.....[2]

Extension 1

Suggest an explanation why exposure to atmospheric pollution changes basic lead(II) carbonate into lead(II) sulphate.

.....

.....

.....[3]

Extension 1 (con'd)

(i) How could you show that the liquid collected contained water?

.....[2]

Extension 2

The window was improved in Switzerland by filling the space between the sheets of glass with krypton which is one of the noble gases. Krypton is a poorer conductor of heat than air because it exists as single atoms rather than the diatomic molecules of oxygen and nitrogen.

(i) Give another use for a noble gas.

.....[1]

(ii) Explain why krypton remains as separate atoms but nitrogen exists as diatomic molecules.

.....

.....

.....[3]

Extension 3

Exhaust gases from a car include carbon dioxide, carbon monoxide and oxides of nitrogen. A catalytic converter does not decrease the emission of carbon dioxide but does decrease the amounts of carbon monoxide and of the oxides of nitrogen.

(i) Explain how oxides of nitrogen are formed.

.....

.....

.....[2]

(ii) How does a catalytic converter decrease the emission of carbon monoxide and of the oxides of nitrogen?

.....

.....

.....[2]

Core 1

a any two uses
e.g. washing, drinking, sanitation, growing plants etc

b 100 ^{o}C

c test add anhydrous / white copper sulphate or anhydrous / blue cobalt chloride
result copper sulphate goes blue / cobalt chloride goes pink

d(i) test add (sodium / potassium / other suitable) hydroxide or add ammonia
result brown / red-brown precipitate

(ii) nitrogen, oxygen

e(i) to kill bacteria / germs / to disinfect the water

(ii) lime is alkaline
to neutralise the acid / chlorine / to increase the pH

f impure water contains some solids
solids trapped on stones / sand
water drains through

Core 2

(i) inert / unreactive

(ii) helium / neon / krypton / xenon / a noble gas

Alternative to Practical 1

a	rusty / brown	
b	level of water	level rises / goes up tube
	explanation	oxygen used up / 1/5 of way up tube / 20% oxygen
c	result	would go out / pops
	explanation	oxygen absent / hydrogen present

Extension 1

Any three from
- acid rain
- sulphur dioxide
- burning of fossil fuels containing sulphur
- sulphuric acid

Extension 2

i

argon	filling electric bulbs
helium	in balloons (not hot air balloons)
neon	in lights
inert atmosphere	for welding

ii any three of these

krypton	has complete energy level or has 8e does not form bonds does not need to lose or gain electrons
nitrogen	has incomplete energy level has five electrons in outer level needs to share to complete 8e needs 3e more forms a bond

Extension 3

i from oxygen and nitrogen (in air)
high temperature in engine

ii to form carbon dioxide
and nitrogen