

AQA – Group 7, the halogens – AS Chemistry P1

1. June/ 2019/Paper_1/No.7

0 7

This question is about Group 7 elements and their compounds.

0 7 . 1

Chlorine is used to treat water even though it is toxic to humans.

Give **one** reason why water is treated with chlorine.

Explain why chlorine is added to water even though it is toxic.

Give an equation for the reaction of chlorine with cold water.

[3 marks]Reason _____
_____Explanation _____

_____Equation _____

07.2

Solid sodium iodide reacts with concentrated sulfuric acid to form iodine and sulfur in a redox reaction.

Give a half-equation to show the conversion of iodide ions to iodine.

Give a half-equation to show the conversion of sulfuric acid to sulfur.

Give an overall equation for this redox reaction.

Identify one other sulfur-containing reduction product formed when solid sodium iodide reacts with concentrated sulfuric acid.

[4 marks]

Half-equation for the conversion of iodide ions to iodine

Half-equation for the conversion of sulfuric acid to sulfur

Overall equation

Other sulfur-containing reduction product

A student completes an experiment to determine the percentage by mass of sodium chloride in a mixture of sodium chloride and sodium iodide.

The student uses this method.

- 600 mg of the mixture are dissolved in water to form a solution.
- An excess of aqueous silver nitrate is added to the solution. This forms a precipitate containing silver chloride and silver iodide.
- Excess dilute ammonia solution is then added to the precipitate. The silver chloride dissolves.
- The silver iodide is filtered off from the solution, and is then washed and dried.

The mass of the silver iodide obtained is 315 mg

0 7 . 3 Silver nitrate is added to the solution.

Suggest why an excess is used.

[1 mark]

0 7 . 4 Calculate the amount, in moles, of silver iodide obtained.

$M_r(\text{AgI}) = 234.8$

[1 mark]

Amount of silver iodide _____ mol

07.5

Calculate, using your answer to Question 07.4, the mass, in grams, of sodium iodide in the mixture.

$$M_r(\text{NaI}) = 149.9$$

[1 mark]

Mass of sodium iodide _____ g

07.6

Calculate, using your answer to Question 07.5, the percentage by mass of sodium chloride in the mixture.

[2 marks]

Percentage of sodium chloride _____

2. June/ 2019/Paper_1/No.17

Which property increases down Group 7?

[1 mark]

A ability to oxidise a given reducing agent

B boiling point

C electronegativity

D first ionisation energy

3. June/ 2019/Paper_1/No.8

0 8

The following pairs of compounds, each in aqueous solution, can be distinguished by simple test-tube reactions.

Give a reagent, or combination of reagents, that can be added to the solutions in each pair to distinguish between them in a single reaction.

State what is observed in each case.

0 8 . 1

NaCl(aq) and BaCl₂(aq)

[3 marks]

Reagent _____

Observation with NaCl _____

Observation with BaCl₂ _____

0 8 . 2

NaCl(aq) and Na₂CO₃(aq)

[3 marks]

Reagent _____

Observation with NaCl _____

Observation with Na₂CO₃ _____

4. June/ 2019/Paper_1/No.22

Which statement is correct about reactions involving halide ions?

[1 mark]

A Sodium chloride forms chlorine when added to concentrated sulfuric acid.

B Sodium chloride forms chlorine when added to bromine.

C Sodium bromide forms bromine when added to concentrated sulfuric acid.

D Sodium bromide forms bromine when added to iodine.

6. June/ 2021/Paper_1/No.20

Some solid sodium halides are reacted with concentrated sulfuric acid.

Which solid sodium halide does **not** produce a sulfur-containing gas as one of the products?

[1 mark]

A NaCl

B NaBr

C NaI

D NaAt