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CHEMISTRY

INORGANIC CHEMISTRY

Level & Board	AQA (A-LEVEL)
TOPIC:	GROUP 7 HALOGEN
PAPER TYPE:	QUESTION PAPER - 2
TOTAL QUESTIONS	10
TOTAL MARKS	34

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Group 7 the Halogens - 2

1. Which pair of solutions, when mixed, reacts to form a dark brown solution?

- A. $\text{NaF(aq)} + \text{Cl}_2\text{(aq)}$
- B. $\text{NaCl(aq)} + \text{Br}_2\text{(aq)}$
- C. $\text{NaBr(aq)} + \text{Cl}_2\text{(aq)}$
- D. $\text{NaI(aq)} + \text{Br}_2\text{(aq)}$

(1)

2. This question is about chlorine.

(a) Chlorine has a low boiling point because the forces between the molecules are weak.

Explain how these forces arise between molecules of chlorine.

(3)

(b) Give an equation for the reaction of chlorine with water.

Give a reason why chlorine is added to drinking water.

(2)

(c) Chlorine reacts with cold, aqueous sodium hydroxide in the manufacture of bleach. Give an equation for this reaction.

(1)

3. 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?

- A. NaCl
- B. NaBr
- C. NaI
- D. NaAt

(1)

4. This question is about Group 7 chemistry.

(a) Give an equation for the reaction of solid sodium bromide with concentrated sulfuric acid to form bromine.
State one observation made during this reaction.

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(2)

(b) A solution that is thought to contain chloride ions and iodide ions is tested.

- Dilute nitric acid is added to the solution.
- Aqueous silver nitrate is added to the solution.

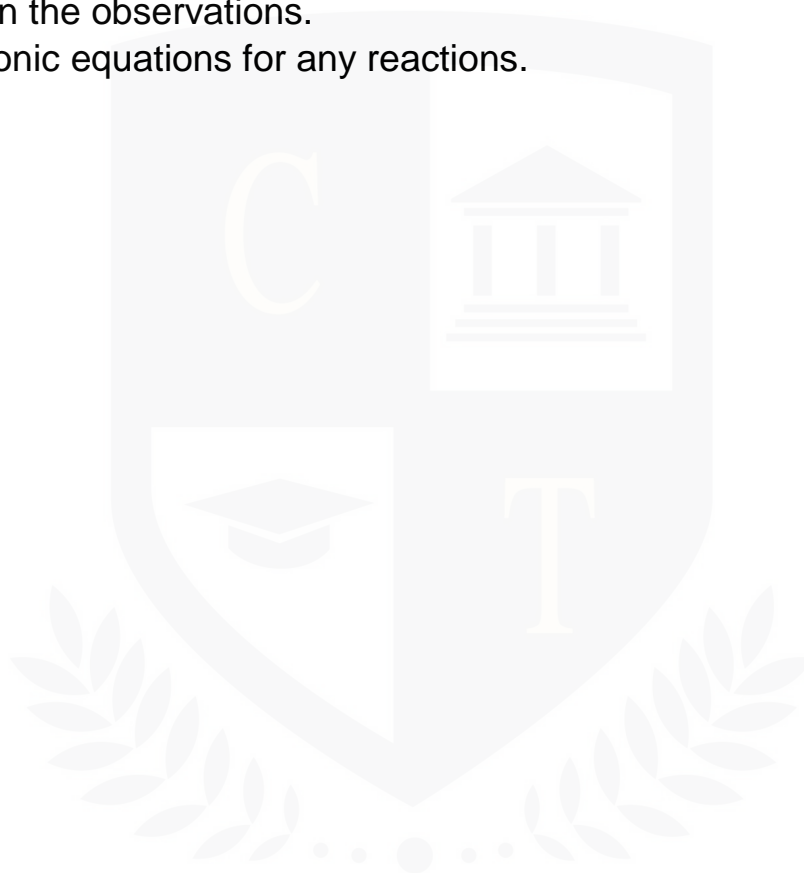
- A pale yellow precipitate forms.
- Excess dilute aqueous ammonia is added to the mixture.

Some of the precipitate dissolves and a darker yellow precipitate remains.

Give a reason for the use of each reagent.

Explain the observations.

Give ionic equations for any reactions.



(5)

5. This question is about Group 7 elements and their compounds. 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.

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(3)

6. Which property increases down Group 7?

- A. ability to oxidise a given reducing agent
- B. boiling point
- C. electronegativity
- D. first ionisation energy

(1)

7. This question is about Group 7 elements and their compounds.
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.

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(4)

8. Which equation shows a redox reaction that does not occur?

- A. $\text{Br}_2(\text{aq}) + 2\text{KI}(\text{aq}) \rightarrow \text{I}_2(\text{aq}) + 2\text{KBr}(\text{aq})$
- B. $\text{Cl}_2(\text{g}) + 2\text{KI}(\text{aq}) \rightarrow \text{I}_2(\text{aq}) + 2\text{KCl}(\text{aq})$
- C. $\text{Cl}_2(\text{g}) + 2\text{KBr}(\text{aq}) \rightarrow \text{Br}_2(\text{aq}) + 2\text{KCl}(\text{aq})$
- D. $\text{I}_2(\text{aq}) + 2\text{KBr}(\text{aq}) \rightarrow \text{Br}_2(\text{aq}) + 2\text{KI}(\text{aq})$

(1)

9. This question is about sodium halides.

(a) State what is observed when silver nitrate solution is added to sodium fluoride solution.

(1)

(b) State one observation when solid sodium chloride reacts with concentrated sulfuric acid.

Give an equation for the reaction. State the role of the chloride ions in the reaction.

(3)

(c) Give an equation for the redox reaction between solid sodium bromide and concentrated sulfuric acid.

Explain, using oxidation states, why this is a redox reaction.

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(3)

(d) State what is observed when aqueous chlorine is added to sodium bromide solution.

Give an ionic equation for the reaction.

(2)

10. Which statement is correct about reactions involving halide ions?

- 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.

(1)

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