Oxidation, reduction and redox equations – A2 2022 Chemistry P1

1. June/2022/Paper_7405/1/No.6

0 6 This question is about some elements in Group 7 and their compounds.

0 6 . 1 Chlorine is added to some drinking water supplies to decrease the risk of people suffering from diseases such as cholera.

State why the amount of chlorine added must be controlled.

[1 mark]

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0 6 . 2 Give an equation for the reaction of chlorine with water to form a solution containing **two** acids.

Explain, with reference to electrons, why this is a redox reaction.

[2 marks]

Equation

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Explanation _____

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0 6 . 3 A student bubbles chlorine gas through a solution of sodium iodide.

State the observation the student would make.

Give an ionic equation for the reaction.

[2 marks]

Observation _____

Ionic equation

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0 6 . 4 The student adds a few drops of concentrated sulfuric acid to a small amount of solid sodium iodide.

Two gaseous sulfur-containing products are formed.

Give an equation for the formation of each of these sulfur-containing products.

State the role of sulfuric acid in the formation of these products.

[3 marks]

Equation 1

Equation 2

Role

0 6 . 5 The student adds a few drops of acidified silver nitrate solution to a solution of an unknown **impure** sodium halide.
The student observes bubbles of gas and a colourless solution.
The student bubbles the gas through calcium hydroxide solution and a white precipitate forms.

Deduce the identity of the sodium halide.

Suggest the identity of the gas.

Give an ionic equation for the formation of this gas from the impurity.

[3 marks]

Identity of sodium halide

Identity of gas

Ionic equation

0 6 . 6 The ClF_2^+ ion contains two different Group 7 elements.

Use your understanding of the electron pair repulsion theory to draw the shape of this ion.

Include any lone pairs of electrons that influence the shape.

Explain why the ion has the shape you have drawn.

Suggest a value for the bond angle in the ion.

[3 marks]

Shape

Explanation _____

_____

_____

Bond angle _____

0 6 . 7 Magnesium is used in the extraction of titanium from titanium(IV) chloride.

Give an equation for this reaction.

[1 mark]

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