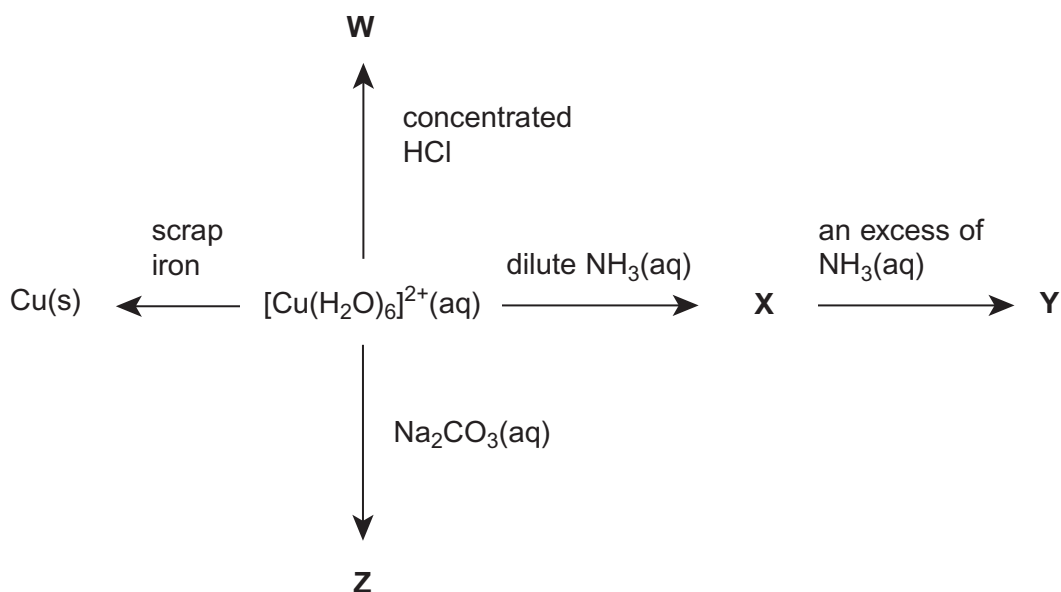


- 5 The scheme below shows some reactions of copper(II) ions in aqueous solution. **W**, **X**, **Y** and **Z** are all copper-containing species.



- 5 (a) Identify ion **W**. Describe its appearance and write an equation for its formation from $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}(\text{aq})$ ions.

Ion **W**

Appearance

Equation
(3 marks)

- 5 (b) Identify compound **X**. Describe its appearance and write an equation for its formation from $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}(\text{aq})$ ions.

Compound **X**

Appearance

Equation
(3 marks)



- 5 (c)** Identify ion **Y**. Describe its appearance and write an equation for its formation from **X**.

Ion **Y**

Appearance

Equation

(3 marks)

- 5 (d)** Identify compound **Z**. Describe its appearance and write an equation for its formation from $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}(\text{aq})$ ions.

Compound **Z**

Appearance

Equation

(3 marks)

- 5 (e)** Copper metal can be extracted from a dilute aqueous solution containing copper(II) ions using scrap iron.

- 5 (e) (i)** Write an equation for this reaction and give the colours of the initial and final aqueous solutions.

Equation

Initial colour

Final colour

(3 marks)

- 5 (e) (ii)** This method of copper extraction uses scrap iron. Give **two** other reasons why this method of copper extraction is more environmentally friendly than reduction of copper oxide by carbon.

Reason 1

Reason 2

(2 marks)

