

Oxidation, reduction and redox equations – AS Chemistry P1

1. No.1

0 1

A student does a series of reactions with aqueous solutions of some potassium halides (P, Q and R) of equal concentration. Each solution contains a different halide ion (chloride, bromide or iodide).

The student adds 3 drops of bromine water to 3 drops of each aqueous solution of potassium halide. The student also adds 3 drops of the bromine water to 3 drops of water.

Table 1 shows the student's observations.

Table 1

	Observation when 3 drops of bromine water are added
Solution P	Orange solution
Solution Q	Brown solution
Solution R	Orange solution
Water	Orange solution

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Identify the halide ion present in Q.

Give the ionic equation for the reaction that occurs when bromine water is added to Q. [2 marks]

Halide ion in Q I⁻

Ionic equation



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Explain, in terms of oxidising ability, why the observations from these reactions do **not** allow the student to identify the halide ion present in **P** and the halide ion present in **R**.

[2 marks]

Bromine is not a very strong oxidising agent to displace chlorine, therefore no visible change will be observed.

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The student does a second experiment to determine the halide ion in each of **P** and **R**.

The student adds a few drops of aqueous silver nitrate solution to 2 cm³ of each potassium halide solution.

Table 2 shows the student's observations.

Table 2

	Student's Observation
P	Precipitate formed
R	Precipitate formed

Describe a further chemical test that the student can complete on the precipitates formed to identify the halide ion present in **P** and the halide ion present in **R**.

Describe how the observations from this test can be used to identify the halide ion present in **P** and the halide ion present in **R**.

[3 marks]

Add dilute ammonia to each precipitate. The precipitate containing chloride ions will react to form a colourless solution. The precipitate containing bromide ions will show no visible change.

2. No.9

09

This question is about redox reactions.

09.1

State, in terms of electrons, the meaning of the term oxidising agent.

[1 mark]

It is an electron acceptor.

09.2

Give a half-equation to show the oxidation of copper to copper(II) ions.

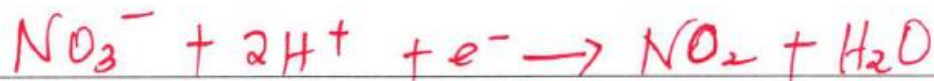
[1 mark]



09.3

Give a half-equation to show the reduction of NO_3^{-} ions in acidic solution to NO_2

[1 mark]



09.4

Use your answers to Question 09.2 and Question 09.3 to deduce an overall equation for the reduction of NO_3^{-} ions by copper.

[1 mark]

