Do not write outside the box

5 Some electrode potentials are shown in the table below. These values are **not** listed in numerical order.

Electrode half-equation			$E^{\ominus}$/ V
$Cl_2(aq) + 2e^-$	$\longrightarrow$	$2Cl^-(aq)$	+1.36
$2HOCl(aq) + 2H^+(aq) + 2e^-$	$\longrightarrow$	$Cl_2(aq) + 2H_2O(l)$	+1.64
$H_2O_2(aq) + 2H^+(aq) + 2e^-$	$\longrightarrow$	$2H_2O(l)$	+1.77
$O_2(g) + 2H^+(aq) + 2e^-$	$\longrightarrow$	$H_2O_2(aq)$	+0.68
$O_2(g) + 4H^+(aq) + 4e^-$	$\longrightarrow$	$2H_2O(l)$	+1.23

5 (a) Identify the most powerful reducing agent from all the species in the table.

....

(1 mark)

5 (b) Use data from the table to explain why chlorine should undergo a redox reaction with water. Write an equation for this reaction.

Explanation ....

....

....

Equation ....

....

....

(2 marks)

5 (c) Suggest **one** reason why the redox reaction between chlorine and water does **not** normally occur in the absence of light.

....

....

(1 mark)

5 (d) Use the appropriate half-equation from the table to explain in terms of oxidation states what happens to hydrogen peroxide when it is reduced.

....

....

....

(2 marks)

Do not write outside the box

5 (e) Use data from the table to explain why one molecule of hydrogen peroxide can oxidise another molecule of hydrogen peroxide. Write an equation for the redox reaction that occurs.

Explanation ....

....

Equation ....

....

....

(2 marks)

8

Turn over for the next question