Question 28 **(7 marks)**

As noted in Question 27, calcium hypochlorite and hydrochloric acid react according to the equation shown below.

$$Ca(OC\ell)_2(s) + 4\ HC\ell(aq) \rightarrow CaC\ell_2(aq) + 2\ H_2O(\ell) + 2\ C\ell_2(g)$$

In this reaction, the chlorine in calcium hypochlorite and the chloride from the hydrochloric acid are both converted to chlorine gas.

(a) What is the oxidation number for the chlorine in:

- calcium hypochlorite, $Ca(OC\ell)_2$
- hydrochloric acid, $HC\ell$? (2 marks)

calcium hypochlorite ☐ hydrochloric acid ☐

Chlorine gas is produced by the oxidation of one of these substances and the reduction of the other.

(b) Write the **two** half-equations showing how chlorine gas is produced from both substances. (5 marks)

Oxidation half-equation

Reduction half-equation