a) Due to the presence of H₂O
and O₂ with a suitable electrolyte (sea water)
the metal hoops that encompass the bucket
would incur large levels of corrosion.
The wood would become water rotten
as water would move into the
cells to cause them to bloat and break
the cell walls, resulting in decay.

6) i) Power source e.g. battery

\[
\text{K(s)} \rightarrow \text{K}^{+} + \text{e}^- \quad \text{Oxidised} \quad 2.94 \text{V} \\
\frac{1}{2} \text{Cl}_2 + \text{e}^- \rightarrow \text{Cl}^- \quad \text{Reduced} \quad 1.36 \text{V} \\
\frac{1}{2} \text{Cl}_2 + \text{K(s)} \rightarrow \text{K}^+ + \text{Cl}_2 \quad \text{ca} = 1.58 \text{V} \]

i) By bubbling of Cl₂ reactants
c) Steel 1: All steels are not steel, some steels are made of different elements, such as iron, carbon, or other elements, that give it specific qualities and properties for specific uses.

Steel 1 is just a common steel with a large amount of Fe and a small amount of carbon, making it relatively malleable but with some degree of corrosion resistance.

Steel 2 has a larger percent of carbon, making it stiff and strong but slightly more brittle.

Steel 3 consists mainly of iron, but a larger proportion of carbon, making it stronger in its tensile strength.

Steel 4 consists of iron, copper, and Ni, which makes the metal stainless as it is not susceptible to corrosion.

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In order to investigate the corrosion of iron in relation to temperature, oxygen concentration and salt concentration the following conditions can be produced:

- **Temperature**: Place a small piece of iron in a small cup and fill with water ensuring the surface is free of oil. Place one cup in the refrigerator at 3°C, one cup in a cupboard at room temp 25°C, and one cup under a heat lamp 40°C.

- **Oxygen concentration**: Place a small piece of metallic iron in a small cup, fill one cup with normal tap water, fill the second with water that has been boiled to remove oxygen and then fill one cup with highly oxygenated water.

- **Salt concentration**: Fill one cup with iron in it with pure tap water, fill one cup with 3.5% salt concentration (from water) and fill one cup with 7% salt concentration.

Leave all samples for 5 weeks and observe the extent of corrosion.
ii) The salt concentration of the water could be reduced in a marine environment after periods of heavy rain and fresh water run off into the ocean.

c) Wooden and copper artifacts that have been immersed in water for at least 100 years would require various techniques in order to restore and conserve them.

The wooden artifacts would have absorbed large amounts of H₂O & ions, to remove these the artifact is placed in a 2% NaCl solution with is not too concentrated as it destroys the artifact but over time draws out dissolved gases and ions. Copper artifacts can undergo electrolytic treatment where a mild price of still acts as a cathode, while the copper is the anode. This helps to remove corrosion and replace electrons. Cu²⁺ ions back to their solid form.

Both copper artifacts and wooden artifacts undergo large amounts of washing with fresh water whilst done slowly to remove all damage it is done while the wash removes rust and other substances. PTO.
Wooden artefacts are often immersed in a form of naphthenic which is added to increase the density in the wood giving it strength and support. Both copper and wooden artefacts can be coated with a protective wax to stop further oxidation and decay, this wax is very innovative as it can be easily removed if new restoration techniques are developed in the future allowing for further improvements in the artefacts.