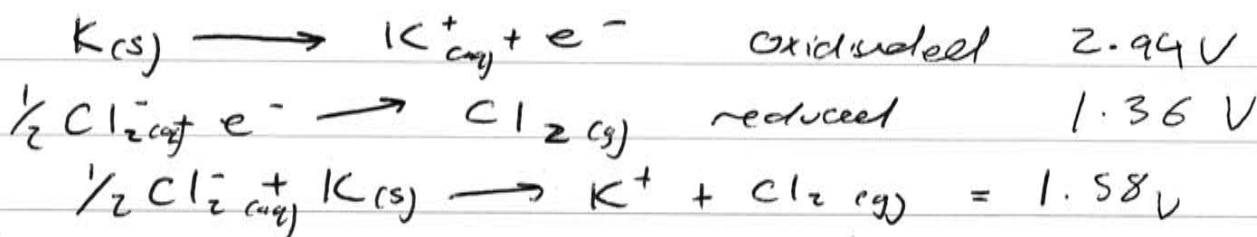
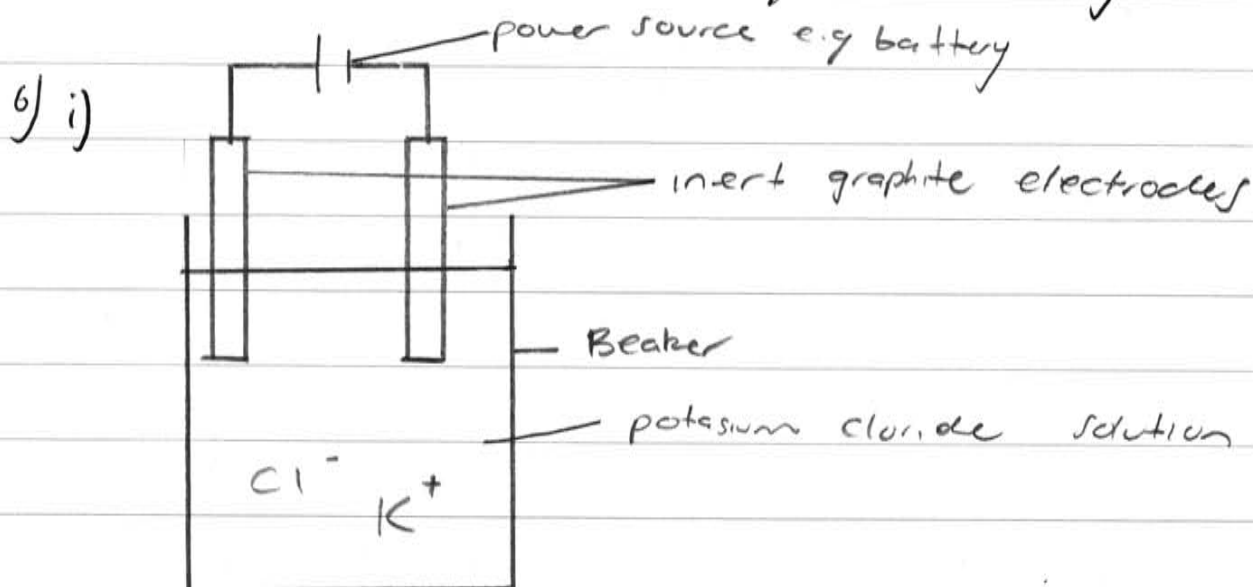


Start here.

a) Due to the presence ~~and~~ of H_2O & O_2 with a suitable electrolyte (sea water) the metal hoops that encompass the buckets would under large levels of corrosion. The wood would become ~~rotten~~ rotten as water would move into the cells & cause them to bloat & break the cell walls resulting in decay.



i) By bubbling of ~~gas~~ $Cl_2(aq)$ ~~gas~~

ii)

c) ~~Steel 1~~ All steels mentioned are alloys meaning they contain different elements with iron that give it specific qualities & 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 large percent of Carbon making it stiff and strong but slightly more brittle.

Steel 3 consists mainly of iron again but a larger proportion of Carbon & Manganese & Silicon this makes the metal stronger in its tensile strength.

Steel 4 consists of iron Chromium & Ni this makes the metal stainless as it is not susceptible to corrosion.

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d) i) In order to investigate the corrosion of iron in relation to temperature, oxygen concentration & salt concentration the following conditions can be produced

- ~~the~~ Temperature - place a small piece of iron in a small cup and fill with water ensuring the surface is ~~not~~ coated with oil.
- place one cup in the refrigerator at 3°C
- place one cup in a cupboard at room temp 25°C
- place one cup under a heat lamp 40°C

- Oxygen concentration - place a small piece of ~~metal~~ 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 (sea water) and fill one cup with 7% salt concentration

- Leave all samples for 5 weeks and ~~record~~ observe 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.

e) ~~W~~ Wooden & copper artefacts that have been immersed in water for at least 100 years would require various techniques in order to restore & conserve them.

The wooden artefacts would ~~be~~ have absorbed large amounts of H_2O & ions, to remove these the artefact is placed in a 2% NaOH bath which is not too concentrated as it ~~destroys~~ the artefact but over time draws out dissolved gases and ions.

Copper artefacts can undergo electrolytic treatment where a mild piece of steel acts as a ~~cathode~~ ^{anode} while the copper is the ~~an~~ cathode, this helps to remove corrosion and replace ~~electrolyte~~ Cu^+ ions back to their solid form.

Both copper artefacts and wooden artefacts undergo large amounts of washing with fresh water which is done slowly to ensure no damage ~~to~~ is done while the wash removes ions and other substances. P.T.O.

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Wooden artefacts are often immersed in a form of naphthalen which is absorbed absorbed and solidifies in the wood giving it strength and support. Both copper & wooden artefacts can be coat with a protective wax to stop future oxidation & decay, this wax is very innovative as it can be ~~any~~ removed if new restoration techniques are developed in the future allowing for further improvements in the artefacts.

You may ask for an extra Writing Booklet if you need more space.