

## Section II

Q29

a.) main metal used in the construction of ships is steel.

ii). Aluminium can be used in these conditions because it does not corrode as fast, which allows it to be exposed to oxidising conditions. Aluminium is wanting to accept electrons not give them away.

b). Magnesium is used as a sacrificial anode

ii.) sacrificial anodes are used because when metals on the hulls of ~~boats~~ boats are exposed to salty, low temperature conditions, then instead of the metal being reduced, the anode gives up electrons and also accepts them, this enables the ship to be protected. The anodes are slowly <sup>deteriorated</sup> ~~reduced~~ and need to be replaced, when this occurs for maximum effect to occur.

c) The uses of steel is to be used on boats, in saline conditions, in cars, cooking utensils if stainless steel, steel is used in many places and corrodes at different rates.

By adding other elements to iron the property increased. Depend on the element being added.

The strength of iron could increase. Properties for use of iron will then increase. Iron would another metal that can be used in different places and the effect could be ~~substantial~~ substantial if an element for improving iron is added. Remember the right element must be added or the iron may result in accepting electrons and the iron then starts to corrode.

d) i. Corrosion, is process that takes place where the reduction in metal takes place, taken place under specific condition.

ii) The procedure is comparing corrosion rate of metal)

Step 1. Place 4 pieces of 3 metals into 12 beakers (1 per beaker).

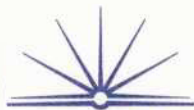
Step 2. Place the metals (stainless steel, steel, ~~lead~~, iron,) into different conditions).

Step 3. ~~Place~~ conditions include oxygen, tap water, distilled water, salt water.

Step 4. Place the metals in a place easily accessible, but out of the reach of other people.

Step 5. Observe the changes that take place in the metal over specified time period (1 week - 4 weeks).





111). accuracy could be improved by, making sure that all metals are clean before placed in the ~~beakers~~, ~~test tubes~~ beakers. (free of rust).

This will improve both the accuracy and reliability of the corrosion make sure the metals are not touched/<sup>moved</sup> as this may affect the

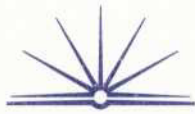
rate. Also ~~the~~ to make sure that when placing them into the salt solution that it is the same solution (concentration used for all metals).

Also make sure that the temperature is performed / stays the same for all metals.

These are all improvements that will improve the accuracy / reliability of the metals.



e). To clean artefacts ~~the~~ recovered from shipwrecks, they must be specifically preserved with sufficient oxygen (or lack of oxygen, in most cases). When recovered the metal iron recovered from the bottom of the ocean, it is very fragile and needs to be kept in that condition. Handling of the object must be taken with extreme care. The artefacts need to be moved from the salinity environment, ~~into~~ where there is no oxygen, or temperature is low into an environment that is higher in temperature. Placing a metal, ~~into~~ into an electrolytic cell, just enables it to accept electrons and regenerate. This may help in the decay process: placing an extra coating over the metal.



make sure the metal (iron) is tested to determine the stability, ~~what~~ what metals may be contributing to its decay.

As many metals found in the bottom of the ocean ~~are not~~ are not pure.

For example (Titanic's hull was not a pure metal, reason why it broke so easily when it collided with the iceberg).

The metal (iron) also can be pressure washed after the density is discovered and this will remove unwanted materials that may still be contributing to its

corrosion. If the density is too low must be left alone. These steps are performed to

Iron ~~will~~ metal should be preserved enough for preserving, and left so that the metal is not at risk of

deteriorating or corroding. Needs to be stored in specific special air tight containers so it can be preserved.  $O_2$  should not damage it after it has been performed ~~properly~~.  
restoration properly.