

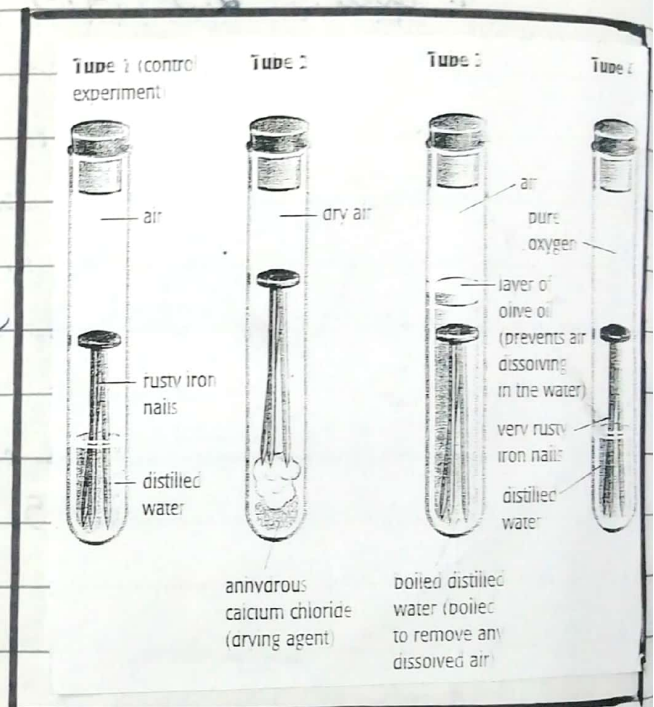
rust — Rust is a red-brown powder consisting mainly of hydrated Iron(III) oxide, $Fe_2O_3 \cdot xH_2O$. Water and oxygen are essential for iron to rust.

When a metal is attacked by air, water or surrounding substances, it is said to corrode. In the case of Iron and steel the corrosion process is known as rusting. Sea water and acid rain increases the rate of corrosion and the rate at which corrosion Iron objects rust.

Experiment for formation of rust —

Description —

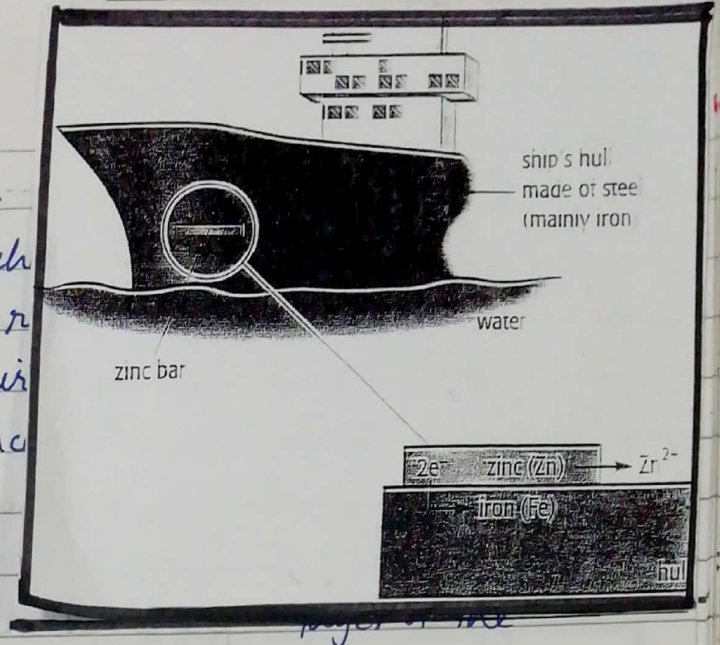
- 1) In tube 2, the air is dry, so the nails do not rust.
- 2) In tube 3, there is no oxygen in the water, so the nails do not rust.
- 3) In tube 4, pure oxygen and water are present, so the nails are very rusty.



Rust prevention —

- 1) painting — Some paints react with iron to form a protective coating. Generally, painting protects the metal as long as it remains unscratched.
- 2) oiling and greasing — The oiling and greasing of the moving parts of machines form a protective film, preventing rusting. The treatment must be repeated to continue the protection.

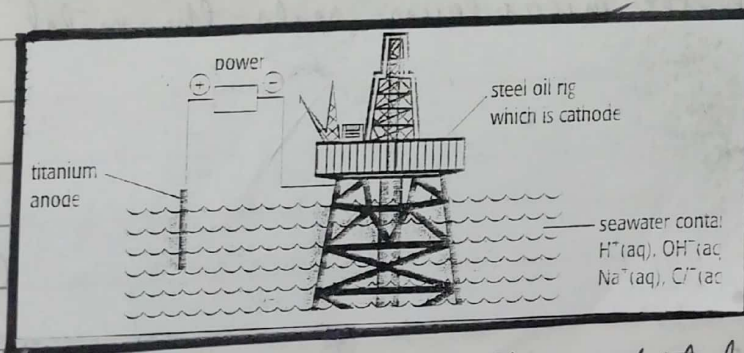
3) Sacrificial protection — Bars of zinc are attached to hulls of ship and to oil rigs. Zinc is more reactive than iron and will react in preference to it and so iron is corroded.



4) Galvanising — An object coated with a more reactive metal zinc is known as galvanising. The zinc layer can be applied by dipping the object into molten zinc. It has the advantage over the plating method is that, the protection still works even if the zinc layer is badly scratched.

5) electroplating — Cans for food can be made from steel coated with tin. The tin is deposited onto the steel used to make food. Some car bumpers, as well as bicycle handle bars are electroplated with chromium to prevent rusting.

Cathodic protection / electrolytic protection —



Large static steel structures can be protected by this method. It involves setting up an electrolytic cell using the iron or steel object as the negative electrode. An inert electrode and a power supply are needed to complete this form of protection which is used to protect oil rigs.