Answer all the questions below then check your answers.

1. What are the three basic methods used to prevent corrosion?

2. What is needed for a metal to corrode?

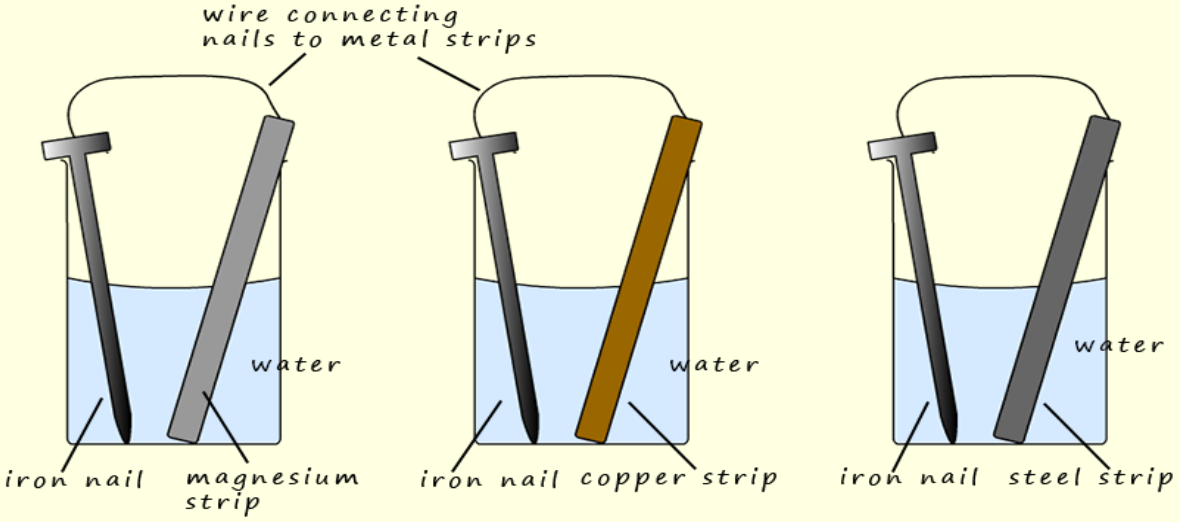
a. What is the difference between corrosion and rusting?

3. What would be the most effective way of preventing the following from corroding?

- A car body
- A bike chain
- An underground pipe
- A steel ship's hull
- Cutlery
- A metal watering can

4. What is sacrificial protection?

a. The diagram below shows 3 steel (iron) nails in water. They are connected by a wire to different strips of metal.



a. In which beaker will:

i the nail corrode?

ii the nail be protected from corrosion?

5. Explain how underground pipes are protected from corrosion?

a. Name one other object which is protected by sacrificial protection.

b. Name one drawback of sacrificial protection of metals.

6. The image below shows two exhaust systems on two different cars. Explain why one exhaust looks very rusty and the other looks like new despite the fact that it is not.

exhaust A

exhaust B

Answers

1. What are the three basic methods used to prevent corrosion?

Barrier methods, sacrificial protection, alloying

2. What is needed for a metal to corrode?

Air (oxygen) and water

a. What is the difference between corrosion and rusting?

Metals corrode; the corrosion of iron is also called rusting.

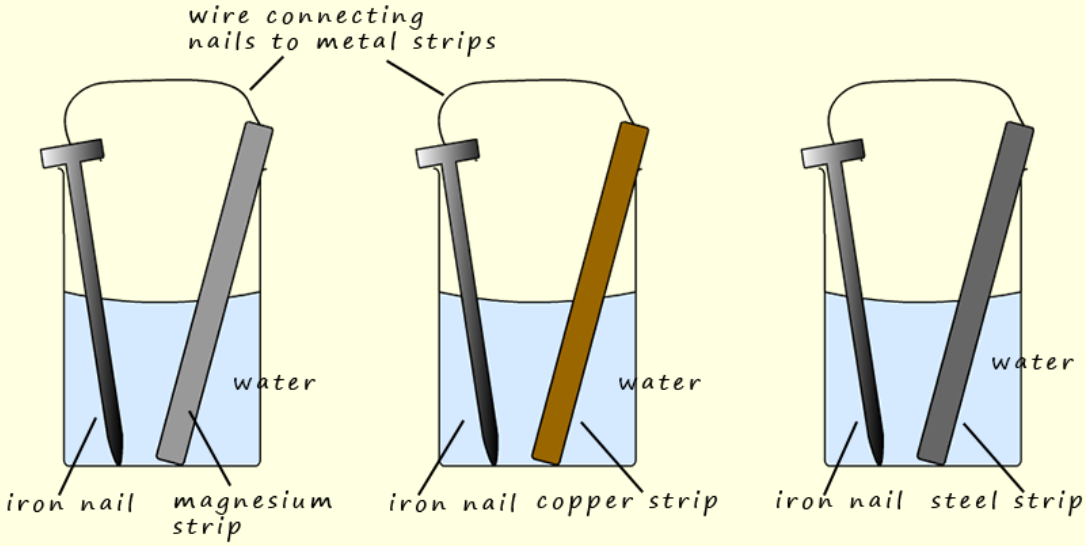
3. What would be the most effective way of preventing the following from corroding?

- A car body - galvanizing, painting, cathodic protection
- A bike chain- oil, grease
- An underground pipe- sacrificial protection using magnesium
- A steel ship's hull - painting and sacrificial protection
- Cutlery- electroplating with an unreactive metal or alloying.
- A metal watering can- galvanising

4. What is sacrificial protection?

When a more reactive metal corrodes in order to protect a less reactive metal from corroding. The more reactive metal sacrifices itself to protect the less reactive metal.

a. The diagram below shows 3 steel (iron) nails in water. They are connected by a wire to different strips of metal.



a. In which beaker will:

I The nail corrode? The second beaker, the iron is connected to less reactive metal, copper. The last beaker, both the steel strip and the steel nail will corrode. Air and water are present.

ii the nail be protected from corrosion? First beaker, the magnesium will sacrifice itself to protect the iron nail from corroding.

5. Explain how underground pipes are protected from corrosion? The pipes have blocks of zinc or magnesium attached or they are connected by a wire to scrap Zn or Mg. These reactive metals will protect the steel pipe by sacrificing themselves to protect the steel.

a. Name one other object which is protected by sacrificial protection. Ship hulls, oil rigs

b. Name one drawback of sacrificial protection of metals. Expensive and needs regular maintenance

6. The image below shows two exhaust systems on two different cars. Explain why one exhaust looks very rusty and the other looks like new despite the fact that it is not.

One is made from stainless steel which will not corrode and the other is made from mild steel which does corrode.


exhaust A


exhaust B