

Quiz (Corrosion of Metals and Its Protection)

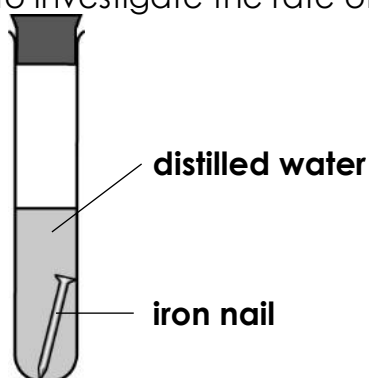
Section A: Multiple-choice

- Which of the following species is NOT produced during the rusting process?
 - Iron(II) ion
 - Hydroxide ion
 - Iron(II) oxide
 - Iron(II) hydroxide
- Car exhaust pipes rust more quickly than other parts of the car because
 - exhaust gas contains water.
 - exhaust gas contains acidic substances.
 - exhaust gas are hot.
 - (1) and (2) only
 - (1) and (3) only
 - (2) and (3) only
 - (1), (2) and (3)
- Which of the following metals, when wrapped around an iron nail, will prevent rusting?
 - Aluminium
 - Copper
 - Magnesium
 - (1) and (2) only
 - (1) and (3) only
 - (2) and (3) only
 - (1), (2) and (3)
- Which of the following statements about rusting is INCORRECT?
 - The chemical formula of iron rust is $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$.
 - Iron is oxidized to iron(III) ion.
 - A higher temperature can speed up rusting.
 - When an iron object rusts, it turns rust indicator blue.
- Which of the following metals are NOT commonly plated on iron to prevent it from rusting?
 - Zinc
 - Tin
 - Chromium
 - Aluminium
- Which of the following methods can protect an iron object from rusting?
 - Greasing
 - Connecting the object to magnesium
 - Coating the object with a layer of iron(III) oxide
 - (1) and (2) only
 - (1) and (3) only
 - (2) and (3) only
 - (1), (2) and (3)
- Which of the following methods are used to prevent underground water pipeline from rusting?
 - Cathodic protection
 - Galvanizing
 - Sacrificial protection
 - (1) and (2) only
 - (1) and (3) only
 - (2) and (3) only
 - (1), (2) and (3)

8. Aluminium articles are corrosion resistant because
- aluminium is unreactive.
 - aluminium undergoes oxidation only at high temperatures.
 - aluminium forms alloy with magnesium.
 - the formation of a thin layer of oxide protects aluminium from further corrosion.

Section B: Structured questions

The following set-up is used to investigate the rate of rusting of iron.



- What are the essential conditions for rusting to occur?
- Suggest a method to determine whether the iron nail rusts.
- How would the rate of rusting change if the following substances are dissolved in the distilled water in the above set-up respectively?
 - Sugar
 - Salt
- How would the rate of rusting change if a copper wire is connected to the iron nail? Explain briefly.

Suggested Answer**Section A**

1.	C	5.	D
2.	D	6.	A
3.	B	7.	B
4.	B	8.	D

Section B Structured questions

- (a) The presence of water and air (oxygen)
- (b) Weigh the test tube and the content to find the increase in mass due to rusting/
Detect the presence of iron(II) ions using the rust indicator.
- (c) (i) The rate of rusting remains unchanged.
(ii) The rate of rusting increases.
- (d) The rate of rusting increases.
Copper, being less reactive than iron, causes iron to lose electrons more readily.