

# Metals by reactivity and how we extract them

Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_ Mark: \_\_\_\_ / 20

This test has eight questions worth 20 marks in total. Write balanced equations where asked, use the reactivity series in your explanations and show your working in calculations. You may use a calculator.

**Level:** Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** GCSE C4

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

## Question 1 Order of reactivity (2 marks)

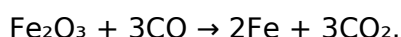
Arrange sodium, copper, iron and magnesium from most reactive to least reactive. (2 marks)

## Question 2 Zinc and copper sulfate (3 marks)

A zinc strip is placed in blue copper(II) sulfate solution.

- Describe what you would see. (1 mark)
- Write the ionic equation for the reaction. (1 mark)
- Explain why copper does not displace zinc from zinc sulfate solution. (1 mark)

## Question 3 Redox in the furnace (3 marks)



- State which substance is reduced and give a reason. (1 mark)
- State which substance is oxidised. (1 mark)
- Name the reducing agent. (1 mark)

## Question 4 Methods of extraction (2 marks)

- Explain why aluminium cannot be extracted by heating its oxide with carbon. (1 mark)
- Explain why gold is found as the metal itself. (1 mark)

## Question 5 Iron from iron oxide (3 marks)

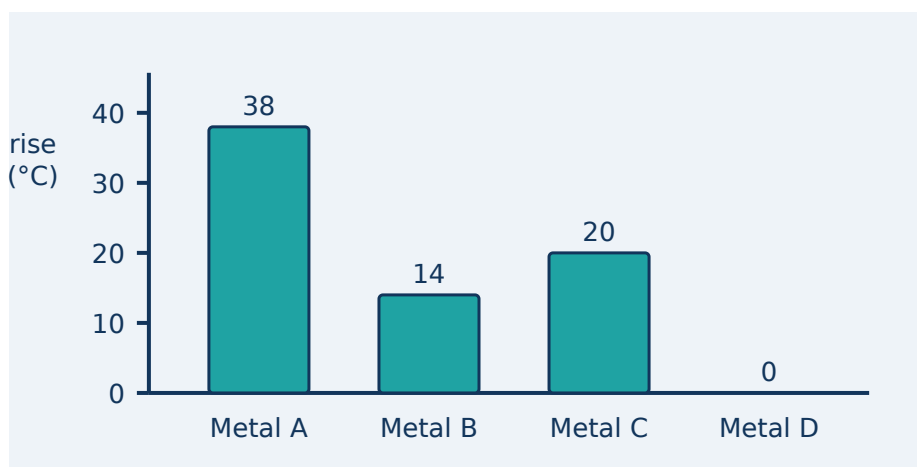
A furnace reduces 4.8 kg of  $\text{Fe}_2\text{O}_3$  (Ar: Fe = 56, O = 16).

- Calculate the molar mass of  $\text{Fe}_2\text{O}_3$ . (1 mark)
- Calculate the moles of  $\text{Fe}_2\text{O}_3$ . (1 mark)
- Calculate the mass of iron formed. (1 mark)

### Question 6 Interpreting temperature rises (3 marks)

The bar chart shows the temperature rise when 1.0 g of four metals is added to copper(II) sulfate solution.

- State which metal is the most reactive. (1 mark)
- State which metal could be copper. (1 mark)
- A fifth metal E gives a rise of 17 °C. Place it in the order. (1 mark)



Temperature rise when 1.0 g of each metal is added to copper(II) sulfate solution.

### Question 7 Galvanising (2 marks)

Iron gates in Accra are coated with zinc.

- Explain how the zinc protects the iron even when the coating is scratched. (2 marks)

### Question 8 Recycling aluminium (2 marks)

Explain two advantages of recycling aluminium instead of extracting it from bauxite. (2 marks)