

9.6 Extraction of metals

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS blast furnace • electrolysis • reduction
• carbon monoxide • limestone

Objective

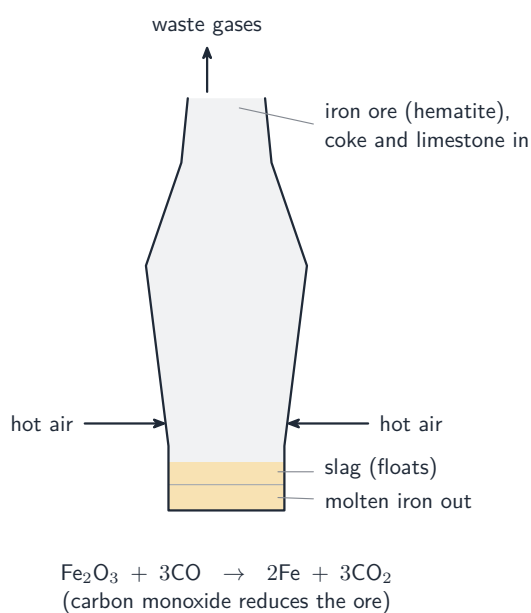
Build the skills to answer exam questions on the **extraction of metals** – choosing the method, the **blast furnace** for iron, and **electrolysis** for aluminium.

You must be able to:

- link the extraction method to the metal's place in the reactivity series
- describe the reduction of iron oxide in the blast furnace
- describe the extraction of aluminium by electrolysis

1 Key knowledge and worked examples

■ Iron and aluminium



Carbon monoxide reduces iron(III) oxide; limestone removes impurities as slag

most reactive			
	K	potassium	
	Na	sodium	
	Ca	calcium	
	Mg	magnesium	
	Al	aluminium	
	C	carbon (non-metal)	
	Zn	zinc	
	Fe	iron	
	H	hydrogen (non-metal)	
	Cu	copper	
	Ag	silver	
	Au	gold	
least reactive			

above carbon:
extract by **electrolysis**

below carbon:
extract by **reduction
with carbon**

Metals above carbon → electrolysis; metals below carbon → heat with carbon

- **iron:** CO reduces Fe_2O_3 to iron.
- **aluminium:** electrolysis of Al_2O_3 dissolved in molten cryolite.

2 Practice

2.1 State which metal-extraction method is used for metals **above** carbon in the reactivity series. [1]

2.2 Name the ore that iron is extracted from. [1]

3 Exam-style questions

3.1 Aluminium is extracted by electrolysis rather than by heating with carbon because it is: [1]

- ☐ **A** less reactive than carbon
- ☐ **B** more reactive than carbon
- ☐ **C** a non-metal
- ☐ **D** a transition metal

3.2 Iron is extracted in the blast furnace.

(a) Name the substance that reduces the iron(III) oxide. [1]

(b) State the role of the limestone. [2]

3.3 In the extraction of aluminium, state why cryolite is used and name the product at the cathode. [2]
