



## Section A:

1. Match each key word with the correct definition.

Solvent
Melting point
Electrolysis

The temperature at which a solid substance melts into a liquid
The process of passing an electric current through a substance, to split it up into its ions.
A liquid that can dissolve a solute to form a solution

2. Complete the table below by adding words from the box.

<div>Least reactive</div> <div>Most reactive</div> <div>Extraction using electrolysis</div> <div>Extraction by reduction using carbon</div>	The Reactivity Series	Reactivity	Method of extraction
	Potassium		
	Sodium		
	Calcium		
	Magnesium		
	Aluminium		
	Carbon		
	Zinc		
	Iron		
	Lead		
	Copper		
	Silver		
	Gold		No extraction needed

3. State two differences between extraction using electrolysis and extraction using carbon reduction.

1. \_\_\_\_\_
2. \_\_\_\_\_

4. Explain why reduction using carbon cannot be used to extract aluminium from aluminium oxide.

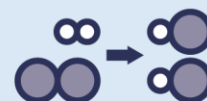
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5. Explain why electrolysis of solid aluminium oxide cannot work.

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## Section B

Aluminium can be extracted from its ore, aluminium oxide using electrolysis.

1. State the chemical formula for aluminium oxide.

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2. State the ions present in aluminium oxide.

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3. During the electrolysis of aluminium oxide, describe what happens at each electrode.

Include:

- which ions move to each electrode
- whether electrons are lost or gained
- what is reduced and what is oxidised
- what is formed at each electrode.

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6. For the electrolysis of aluminium oxide, cryolite is added to the electrolyte mixture.

The table below contains the melting points of these compounds.

Compound	Melting point (°C)
Aluminium oxide	2072
Cryolite	980

Explain why a mixture with cryolite is used to electrolyse aluminium oxide, using your own knowledge and data from the table.

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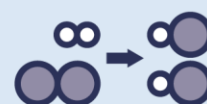
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Section C - Bauxite can contain between 16% to 25% aluminium.

1. Calculate the relative formula mass of aluminium oxide.

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2. Calculate the percentage by mass of aluminium in aluminium oxide.

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3. A particular sample of bauxite found in Southern France contained 23 % aluminium.

- (a) Calculate the mass of aluminium in a 1.53 kg sample of this particular bauxite sample. Give your answer in g

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\_\_\_\_\_ g

- (b) Explain how you know that bauxite is **not** a compound.

Use information in the question and your answer to part (a).

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4. Explain why pure aluminium is not found in bauxite.

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5. Aluminium oxide is found in bauxite and electrolysis is used to extract aluminium.

- (a) Predict what you would observe at each electrode during the electrolysis of aluminium oxide.

Explain your answers.

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- (b) Describe the disadvantage of not adding cryolite to aluminium oxide when extracting aluminium using electrolysis.

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