



## Section A:

- Write a definition for oxidation and reduction in terms of electrons.

Oxidation - \_\_\_\_\_

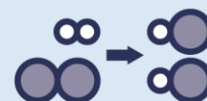
Reduction - \_\_\_\_\_

- Using your handout showing the list of common ions and their formulae, complete the table below.

Compound formula	Ions that make up the compound
$\text{Mg}(\text{NO}_3)_2$	$\text{Mg}^{2+}$ and $2 \text{NO}_3^-$
$\text{AgNO}_3$	
$\text{HCl}$	
$\text{Na}_2\text{O}$	
$\text{CuCl}_2$	
$\text{LiOH}$	
$\text{CuSO}_4$	
$\text{H}_2\text{CO}_3$	
$\text{Ca}(\text{OH})_2$	
$\text{Al}(\text{OH})_3$	

- Using your knowledge of reduction and oxidation, complete the table below:

A	B	Would A need to <u>gain</u> or <u>lose</u> electrons to become B?	How many electrons?
$\text{H}_{(\text{g})}$	$\text{H}^+_{(\text{aq})}$		
$\text{Li}^+_{(\text{aq})}$	$\text{Li}_{(\text{s})}$		
$\text{F}_{2(\text{g})}$	$2\text{F}^-_{(\text{aq})}$		
$2\text{I}^-_{(\text{aq})}$	$\text{I}_{2(\text{s})}$		
$2\text{Cl}^-_{(\text{aq})}$	$\text{Cl}_{2(\text{g})}$		
$\text{Ca}_{(\text{s})}$	$\text{Ca}^{2+}_{(\text{aq})}$		
$\text{S}^{2-}_{(\text{aq})}$		Lose	2
	$\text{Mg}_{(\text{s})}$	Gain	2
$\text{Al}^{3+}_{(\text{aq})}$		Gain	





## Section B

1. State one way in which ionic equations are different to chemical equations.

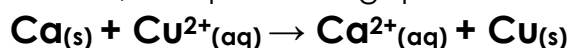
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2. Explain what is meant by the term 'spectator ions'.

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3. Using the ionic equation below, complete the gaps in the sentences.



- Calcium \_\_\_\_\_ lose 2 electrons to become \_\_\_\_\_ charged ions.
- This loss of electrons means that calcium is \_\_\_\_\_.
- Copper \_\_\_\_\_ gain 2 electrons to become \_\_\_\_\_ atoms.
- This gain of electrons means that copper is \_\_\_\_\_.

4. Copper reacts with hydrochloric acid.

- (a) Write the word equation for this reaction.

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- (b) Write the **balanced** chemical symbol equation for this reaction.

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- (c) Cross out any spectator ions in the equation in part (b)

- (d) Write the ionic equation for this reaction.

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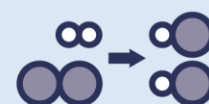
5. Potassium reacts with magnesium sulphate solution.

- (a) Write the chemical symbol equation for this reaction.

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- (b) Write the ionic equation for this reaction.

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## Section C

A student did an experiment to extract copper from copper oxide. They used the following method.

- Mix 1g copper oxide with 2g powdered carbon in a test tube
- Heat the mixture for 5 min
- Leave the mixture to cool

Carbon powder and copper oxide are both a dull, black colour.

Copper metal is a red-orange, shiny colour.

1. The container of copper oxide has the following hazard symbol.

State what this hazard symbol shows and describe a precaution the student should take when using copper oxide.



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2. A gas is produced during this reaction.

State the name of this gas and describe how to test for it.

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3. Suggest what would be observed in the test tube at the end of this experiment.

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4. Write the balanced chemical equation for the reaction between copper oxide and carbon.

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5. Is this a displacement reaction? Explain how you know.

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6. Explain whether copper is reduced or oxidised in this reaction.

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