

## Section A:

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

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

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

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

Compound formula	Ions that make up the compound
Mg(NO <sub>3</sub> ) <sub>2</sub>	Mg <sup>2+</sup> and 2 NO <sub>3</sub> <sup>-</sup>
AgNO <sub>3</sub>	
HCl	
Na <sub>2</sub> O	
CuCl <sub>2</sub>	
LiOH	
CuSO <sub>4</sub>	
H <sub>2</sub> CO <sub>3</sub>	
Ca(OH) <sub>2</sub>	
Al(OH) <sub>3</sub>	

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?
H <sub>(g)</sub>	H <sup>+</sup> <sub>(aq)</sub>		
Li <sup>+</sup> <sub>(aq)</sub>	Li <sub>(s)</sub>		
F <sub>2(g)</sub>	2F <sup>-</sup> <sub>(aq)</sub>		
2I <sup>-</sup> <sub>(aq)</sub>	I <sub>2(s)</sub>		
2Cl <sup>-</sup> <sub>(aq)</sub>	Cl <sub>2(g)</sub>		
Ca <sub>(s)</sub>	Ca <sup>2+</sup> <sub>(aq)</sub>		
S <sup>2-</sup> <sub>(aq)</sub>		Lose	2
	Mg <sub>(s)</sub>	Gain	2
Al <sup>3+</sup> <sub>(aq)</sub>		Gain	



## Section B

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

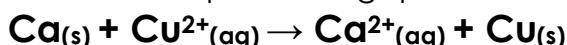
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2. Explain what is meant by the term 'spectator ions'.

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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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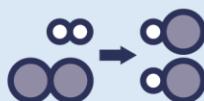
5. Potassium reacts with magnesium sulphate solution.

(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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