



**1 a** Give the electron structure of the Group 1 elements sodium and potassium.

sodium ..... potassium .....

**b** Explain why sodium and potassium are both in Group 1 of the Periodic Table.

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**c** Explain why sodium and potassium have similar properties.

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**d** Write word and balanced equations for the reaction of potassium with water.

word equation .....

balanced equation .....

**e** Describe what you see when potassium reacts with water.

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**f** Explain why potassium is more reactive than sodium. ....

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**g** Explain why Group 1 elements are called the alkali metals. ....

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1 Give the formula of the following ions.

aluminium ..... nitrate ..... zinc(II) .....

2 Give the formula of the following ionic compounds.

calcium oxide ..... sodium bromide .....

aluminium sulfate ..... magnesium hydroxide .....

3 Water is a molecular substance with the molecular formula  $H_2O$ .

a What type of bonds are there in water molecules? .....

b Water boils at  $100^\circ C$ . Explain why water has a low boiling point. ....  
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c Explain why pure water does not conduct electricity. ....  
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d Explain what the molecular formula  $H_2O$  means. ....  
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4 Sodium oxide is an ionic substance with the formula  $Na_2O$ .

a What type of bonds are there in sodium oxide? .....

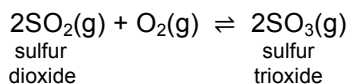
b Sodium oxide melts at  $1132^\circ C$ . Explain why sodium oxide has a high melting point. ....  
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c Explain why sodium oxide conducts electricity when molten but not as a solid. ....  
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d Explain what the formula  $Na_2O$  means. ....  
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Sulfur dioxide reacts with oxygen to form sulphur trioxide in a reaction that reaches a dynamic equilibrium in a closed system. The forward reaction is exothermic.



- 1 What happens to the equilibrium yield of sulphur trioxide (SO<sub>3</sub>) if the temperature is increased? Explain your answer.

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- 2 What happens to the equilibrium yield of sulphur trioxide (SO<sub>3</sub>) if the pressure is increased? Explain your answer.

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- 3 What happens to the equilibrium yield of sulphur trioxide (SO<sub>3</sub>) if more oxygen (O<sub>2</sub>) is added? Explain your answer.

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- 4 What happens to the equilibrium yield of sulphur trioxide (SO<sub>3</sub>) if a catalyst is used? Explain your answer.

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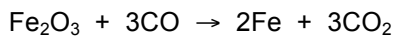
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1 What mass of iron is formed when 240 g of iron(III) oxide reacts with carbon monoxide?



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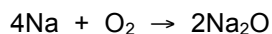
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2 What mass of oxygen reacts with 9.2 g of sodium?



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3 How many moles in each of the following?

a 12 mg of magnesium .....

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b 8.0 kg of oxygen .....

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4 What is the mass of each of the following?

a 0.100 moles of calcium hydroxide .....

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b 0.025 moles of aluminium sulfate .....

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