**4** This question is about the chemistry of the Period 3 elements and the trends in their properties.

**4 (a) (i)** Describe what you would observe when magnesium burns in oxygen. Write an equation for the reaction that occurs. State the type of bonding in the oxide formed.

Observations .....

.....

.....

.....

Equation .....

Type of bonding .....

*(4 marks)*

**4 (a) (ii)** Describe what you would observe when sulfur burns in oxygen. Write an equation for the reaction that occurs. State the type of bonding in the oxide formed.

Observations .....

.....

.....

.....

Equation .....

Type of bonding .....

*(4 marks)*

**4 (b)** State the type of bonding in sodium oxide. Explain why sodium oxide reacts to form an alkaline solution when added to water.

Type of bonding.....

Explanation.....

.....

.....

.....

*(3 marks)*

**4 (c)** Outline an experiment that could be used to show that aluminium oxide contains ions.

.....

.....

.....

*(2 marks)*

*(Extra space)* .....

.....

**4 (d)** Suggest **one** reason why a thin layer of aluminium oxide protects aluminium from corrosion in moist air.

.....

.....

*(1 mark)*

**4 (e)** Write an ionic equation in each case to show how aluminium oxide reacts with the following

**4 (e) (i)** hydrochloric acid

.....

*(1 mark)*

**4 (e) (ii)** aqueous sodium hydroxide.

.....

*(1 mark)*

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**Turn over for the next question**