2 Sodium, aluminium and silicon are solid elements with a silver colour. These elements react with oxygen to form oxides with high melting points. Aluminium is a reactive metal, but it resists corrosion in water because it has a surface coating of aluminium oxide.

2 (a) In terms of its structure and bonding, explain why silicon dioxide has a high melting point.

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.....

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(3 marks)

(Extra space) .....

.....

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2 (b) State the type of bonding in aluminium oxide.

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(1 mark)

2 (c) Write an equation for the reaction of aluminium with oxygen.

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(1 mark)

2 (d) Suggest **one** property of the aluminium oxide coating that causes aluminium to resist corrosion in water.

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(1 mark)

2 (e) Sodium metal is **not** resistant to corrosion in water, despite having a surface coating of sodium oxide. Write an equation to show how sodium oxide reacts with water.

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(1 mark)

2 (f) Aluminium oxide is amphoteric. It reacts with acids and alkalis.

2 (f) (i) Write an equation for the reaction between aluminium oxide and hydrochloric acid.

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(1 mark)

2 (f) (ii) Write an equation for the reaction between aluminium oxide and an excess of aqueous sodium hydroxide.

.....

(1 mark)

2 (g) Silicon dioxide does **not** react with hydrochloric acid but it does react with sodium hydroxide. State **one** property of silicon dioxide that can be deduced from this information and write an equation for its reaction with sodium hydroxide.

Property .....

Equation .....

(2 marks)

11

Turn over for the next question