QUICK CHECK — PERIOD 3 OXIDES (A)

1 Magnesium oxide is formed when magnesium reacts with oxygen.

a Write an equation for this reaction. **$2Mg + O_2 \rightarrow 2MgO$**

b Describe what you would see in this reaction. **burns with bright white flame; gives white solid**

c Write an equation for the reaction of magnesium oxide with water. Give the approximate pH of the solution formed.

equation **$MgO + H_2O \rightarrow Mg(OH)_2$** pH **10/11**

d Explain why the reaction of sodium oxide reacts with water forms a solution that is more alkaline.

O^{2-} ion reacts with water to form OH^- ions ($O^{2-} + H_2O \rightarrow 2\ OH^-$)
but MgO is less soluble than Na_2O and so fewer O^{2-} ions dissolve and so fewer OH^- ions formed

e Write an equation for the reaction of magnesium oxide with nitric acid.

$MgO + 2HNO_3 \rightarrow Mg(NO_3)_2 + H_2O$

2 Sulfur (IV) oxide is formed when sulfur reacts with oxygen.

a Write an equation for this reaction. **$S + O_2 \rightarrow SO_2$**

b Describe what you would see in this reaction. **burns with blue flame; forms choking gas**

c Write an equation for the reaction of sulfur (IV) with water. Give the approximate pH of the solution formed.

equation **$SO_2 + H_2O \rightarrow H_2SO_3$** pH **3/4**

d Write an equation for the reaction of sulfur (IV) oxide with potassium hydroxide.

$SO_2 + 2KOH \rightarrow K_2SO_3 + H_2O$

3 In general terms, metal oxides are usually basic and non-metal oxides are usually acidic. Explain this difference in terms of structure and bonding.

metal oxides are ionic and release O^{2-} ions into water
O^{2-} ions react with water to form OH^- ions making solution alkaline

non-metal oxides are usually molecular
H_2O attacks the $\delta+$ non-oxygen atom and this reaction releases H^+ ions making solution acidic

4 Write an equation for the reaction of sodium oxide with phosphorus oxide.

$6Na_2O + P_4O_{10} \rightarrow 4Na_3PO_4$