**June 2002, Q14**

1. An element of the third period (Na to S) is heated in chlorine. The product is purified and then added to water. The resulting solution is found to be neutral.

What is the element?

A sodium B aluminium C silicon Dphosphorus

**Nov 2007, Q13**

2. Which species has the largest radius?

A P3− B Cl*−* C Ar D K+

**Nov 2006, Q34**

3. Which magnesium compounds lose mass when heated by a Bunsen flame?

1 magnesium carbonate 2 magnesium nitrate 3 magnesium oxide

**Nov 2008, Q 17**

4. A student observed the reactions when sodium chloride and sodium iodide were each reacted separately with concentrated sulphuric acid and concentrated phosphoric acid. The observations are recorded in the table.

|  |  |  |
| --- | --- | --- |
|  | Sodium chloride | Sodium iodide |
| Conc. H2SO4 | Colourless acidic gas formed | Purple vapour formed |
| Conc. H3PO4 | Colourless acidic gas formed | Colourless acidic gas formed |

Which deduction can be made from these observations?

A Concentrated phosphoric acid is a stronger oxidising agent than concentrated sulphuric acid.

B Concentrated phosphoric acid is a stronger oxidising agent than iodine.

C Concentrated sulphuric acid is a stronger oxidising agent than chlorine.

D Concentrated sulphuric acid is a stronger oxidising agent than iodine.

**Nov 2002, Q3**

5. The oxides of the third period include the following:

Na2O; MgO; Al2O3; SO2; SO3.

(a) Showing outer electrons only, draw a dot-and-cross diagram for magnesium oxide, MgO.

[1]

(b) From the list above, identify one oxide (in each case) which fits the description given.

(i) An oxide that reacts with water forming a strongly alkaline solution.

(ii) An oxide that is insoluble in water.

(iii) An oxide that reacts vigorously with water forming a strongly acidic solution.

(iv) An oxide that has a simple molecular structure.

(v) An oxide that acts as a food preservative.

[5]

(c) Write equations for the reaction of

(i) aluminium oxide and dilute hydrochloric acid,

(ii) sulphur dioxide and aqueous sodium hydroxide.

[2]

(d) Antimony, Sb, has been known for about 6000 years. It is present in many ancient forms of bronze, but now its main use is to strengthen lead alloys.

Antimony is produced in a two-stage process from stibnite, a sulphide ore, Sb2S3.

The ore is first roasted in oxygen to form the oxide.

2Sb2S3 + .............. O2 → Sb4O6 + ..............SO2

(i) Balance the above equation.

The oxide is then reduced with carbon.

Sb4O6 + 3C→ 4Sb + 3CO2

(ii) What is the oxidation number of antimony in Sb4O6?

(iii) Calculate the volume of carbon dioxide, measured at room temperature and pressure, that would be produced by the processing of 10 moles of Sb2S3.

[4]

[Total : 12]

6. Magnesium is in Group II of the Periodic Table.

(a) Complete, and balance if necessary, the following equations:

(i) Mg (s) + H2O (g) →

(ii) Mg (s) + O2(g) →

(iii) MgO (s) + H2O (l) →

[3]

(b) Magnesium reacts *very* slowly with cold water whereas barium reacts rapidly.

This shows the increasing reactivity of the Group II elements on descending the group.

1. Suggest why the reactivity increases in this way.

(ii) Name one other reaction of Group II elements which illustrates this trend of increasing reactivity.

[3]

(c) (i) Magnesium oxide is used as a refractory lining in some furnace linings.

What property makes it suitable for its use?

(ii) Name two other Group II compounds, and state a use for each of them.

[3] [Total: 9]