$$\overset{+6\ -1}{UF_6}$$
$$+6\ -6$$

b. Oxygen and sulfur are each more electronegative than hydrogen, so hydrogen has an oxidation number of +1. Oxygen is not combined with a halogen, nor is H_2SO_4 a peroxide. Therefore, the oxidation number of oxygen is –2. Place these known oxidation numbers above the appropriate symbols. Place the total of the oxidation numbers underneath.

$$\overset{+1\quad -2}{H_2SO_4}$$
$$+2\quad -8$$

The sum of the oxidation numbers must equal zero, and there is only one sulfur atom in each molecule of H_2SO_4. Because (+2) + (–8) = –6, the oxidation number of each sulfur atom must be +6.

c. To assign oxidation numbers to the elements in ClO_3^-, proceed as in parts (a) and (b). Remember, however, that the total of the oxidation numbers should equal the overall charge of the anion, 1–. The oxidation number of a single oxygen atom in the ion is –2. The total oxidation number due to the three oxygen atoms is –6. For the chlorate ion to have a 1– charge, chlorine must be assigned an oxidation number of +5.

$$\overset{+5\ -2}{ClO_3^-}$$
$$+5\ -6$$

PRACTICE

Answers in Appendix E

1. Assign oxidation numbers to each atom in the following compounds or ions:
   - **a.** HCl
   - **b.** CF_4
   - **c.** PCl_3
   - **d.** SO_2
   - **e.** HNO_3
   - **f.** KH
   - **g.** P_4O_{10}
   - **h.** $HClO_3$
   - **i.** N_2O_5
   - **j.** $GeCl_2$

extension

Go to **go.hrw.com** for more practice problems that ask you to assign oxidation numbers.

Keyword: HC6FRMX

Using Oxidation Numbers for Formulas and Names

As shown in **Table 6,** many nonmetals can have more than one oxidation number. (A more extensive list of oxidation numbers is given in Appendix Table A-15.) These numbers can sometimes be used in the same manner as ionic charges to determine formulas. Suppose, for example, you want to know the formula of a binary compound formed between sulfur and oxygen. From the common +4 and +6 oxidation states of sulfur, you could expect that sulfur might form SO_2 or SO_3. Both are known compounds. Of course, a formula must represent facts. Oxidation numbers alone cannot be used to prove the existence of a compound.