Finally, describe whether each element has high reactivity or low reactivity.

a. $[Xe]4f^{14}5d^{9}6s^{1}$
b. $[Ne]3s^{2}3p^{5}$
c. $[Ne]3s^{2}3p^{6}$
d. $[Xe]4f^{6}6s^{2}$

SOLUTION

a. The $4f$ sublevel is filled with 14 electrons. The $5d$ sublevel is partially filled with nine electrons. Therefore, this element is in the *d* block. The element is the transition metal platinum, Pt, which is in Group 10 and has a low reactivity.

b. The incompletely filled *p* sublevel shows that this element is in the *p* block. A total of seven electrons are in the *ns* and *np* sublevels, so this element is in Group 17, the halogens. The element is chlorine, Cl, and is highly reactive.

c. This element has a noble-gas configuration and thus is in Group 18 in the *p* block. The element is argon, Ar, which is an unreactive nonmetal and a noble gas.

d. The incomplete $4f$ sublevel shows that the element is in the *f* block and is a lanthanide. Group numbers are not assigned to the *f* block. The element is samarium, Sm. All of the lanthanides are reactive metals.

PRACTICE

Answers in Appendix E

1. For each of the following, identify the block, period, group, group name (where appropriate), element name, element type (metal, nonmetal, or metalloid), and relative reactivity (high or low):

a. $[He]2s^{2}2p^{5}$
b. $[Ar]3d^{10}4s^{1}$

extension

Go to **go.hrw.com** for more practice problems that ask you to locate elements on the periodic table and predict their properties based on their electron configurations.

Keyword: HC6PERX

SECTION REVIEW

1. Into what four blocks can the periodic table be divided to illustrate the relationship between the elements' electron configurations and their placement in the periodic table?

2. What name is given to each of the following groups of elements in the periodic table?

a. Group 1 **c.** Groups 3–12 **e.** Group 18
b. Group 2 **d.** Group 17

3. What are the relationships between group configuration and group number for elements in the *s*, *p*, and *d* blocks?

4. Without looking at the periodic table, write the outer electron configuration for the Group 15 element in the fourth period.

5. Without looking at the periodic table, identify the period, block, and group of the element that has the electron configuration $[Ar]3d^{7}4s^{2}$.

Critical Thinking

6. **APPLYING MODELS** Period 7 contains elements in the *s*, *p*, *d*, and *f* blocks. Suppose that there were a Period 8 and it contained elements in the "g" block, where "g" had the angular momentum quantum number $\ell = 4$. If a hypothetical element in Period 8 had an atomic number of 120, into what group in the periodic table would the element fit, and what properties might it have (assuming it does not radioactively decay)?