

PRACTICE*Answers in Appendix E*

1. a. Write both the complete electron-configuration notation and the noble-gas notation for iodine, I. How many inner-shell electrons does an iodine atom contain?
b. How many electron-containing orbitals are in an atom of iodine? How many of these orbitals are filled? How many unpaired electrons are there in an atom of iodine?
2. a. Write the noble-gas notation for tin, Sn. How many unpaired electrons are there in an atom of tin?
b. How many electron-containing *d* orbitals are there in an atom of tin? Name the element in the fourth period whose atoms have the same number of electrons in their highest energy levels that tin's atoms do.
3. a. Write the complete electron configuration for the element with atomic number 25. You may use the diagram shown in **Figure 19**.
b. Identify the element described in item 3a.
4. a. How many orbitals are completely filled in an atom of the element with atomic number 18? Write the complete electron configuration for this element.
b. Identify the element described in item 4a.

extension

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 **Keyword:** HC6ARRX

Elements of the Sixth and Seventh Periods

The sixth period consists of 32 elements. It is much longer than the periods that precede it in the periodic table. To build up electron configurations for elements of this period, electrons are added first to the 6*s* orbital in cesium, Cs, and barium, Ba. Then, in lanthanum, La, an electron is added to the 5*d* orbital.

With the next element, cerium, Ce, the 4*f* orbitals begin to fill, giving cerium atoms a configuration of $[\text{Xe}]4f^15d^16s^2$. In the next 13 elements, the 4*f* orbitals are filled. Next the 5*d* orbitals are filled and the period is completed by filling the 6*p* orbitals. Because the 4*f* and the 5*d* orbitals are very close in energy, numerous deviations from the simple rules occur as these orbitals are filled. The electron configurations of the sixth-period elements can be found in the periodic table inside the back cover of the text.

The seventh period is incomplete and consists largely of synthetic elements, which will be discussed in Chapter 21.