# 5 ELECTRONS IN ATOMS

## Practice Problems

*In your notebook, solve the following problems.*

### SECTION 5.1  MODELS OF THE ATOM

**1.** How many sublevels are in the following principal energy levels?

    **a.** $n = 1$           **c.** $n = 3$           **e.** $n = 5$

    **b.** $n = 2$           **d.** $n = 4$           **f.** $n = 6$

**2.** How many orbitals are in the following sublevels?

    **a.** $1s$ sublevel         **d.** $4f$ sublevel         **g.** fifth principal energy level

    **b.** $5s$ sublevel         **e.** $7s$ sublevel         **h.** $6d$ sublevel

    **c.** $4d$ sublevel         **f.** $3p$ sublevel

**3.** What are the types of sublevels and number of orbitals in the following energy levels?

    **a.** $n = 1$           **c.** $n = 3$           **e.** $n = 5$

    **b.** $n = 2$           **d.** $n = 4$

### SECTION 5.2  ELECTRON ARRANGEMENT IN ATOMS

**1.** Write a complete electron configuration of each atom.

    **a.** hydrogen         **d.** barium          **g.** krypton

    **b.** vanadium         **e.** bromine         **h.** arsenic

    **c.** magnesium       **f.** sulfur          **i.** radon

### SECTION 5.3  PHYSICS AND THE QUANTUM MECHANICAL MODEL

**1.** What is the wavelength of the radiation whose frequency is $5.00 \times 10^{15} \text{ s}^{-1}$? In what region of the electromagnetic spectrum is this radiation?

**2.** An inexpensive laser that is available to the public emits light that has a wavelength of 670 nm. What are the color and frequency of the radiation?

**3.** What is the energy of a photon whose frequency is $2.22 \times 10^{14} \text{ s}^{-1}$?

**4.** What is the frequency of a photon whose energy is $6.00 \times 10^{-15} \text{ J}$?

**5.** Arrange the following types of electromagnetic radiation in order of increasing frequency.

    **a.** infrared          **c.** visible light        **e.** microwaves

    **b.** cosmic rays       **d.** radio waves        **f.** ultraviolet

**6.** Suppose that your favorite AM radio station broadcasts at a frequency of 1600 kHz. What is the wavelength in meters of the radiation from the station?