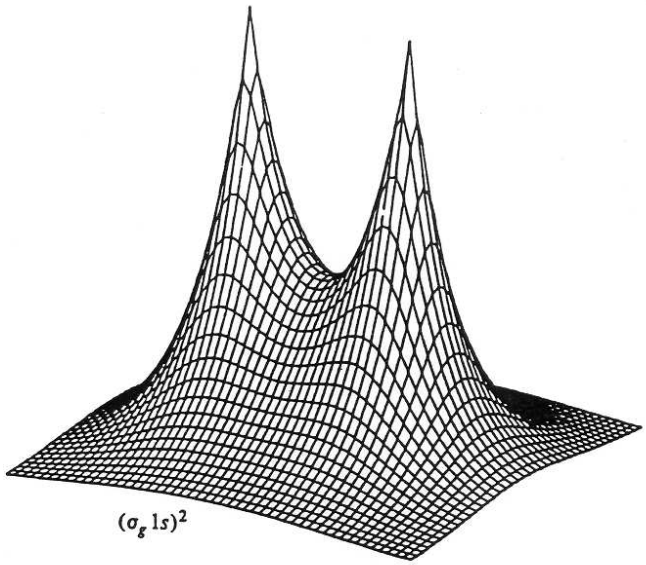
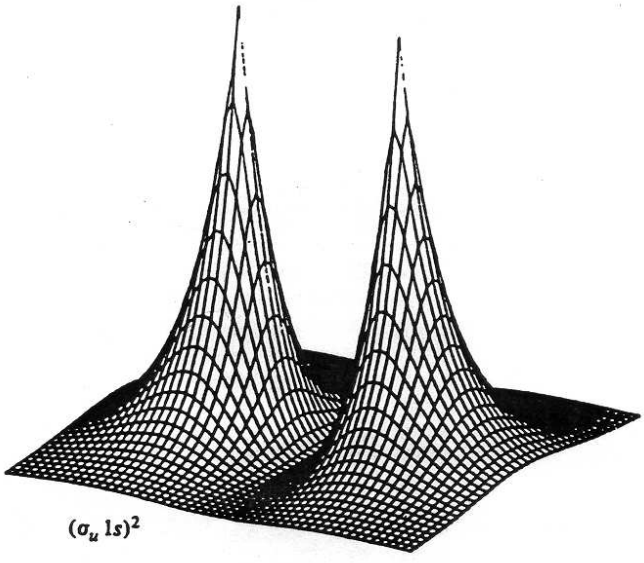


(*c*)



(*d*)

FIGURE 12-7
(Continued)

from **Elementary Quantum Chemistry**, 2nd Edition
by F. L. Pilar, McGraw-Hill, New York, 1990, p.348-349.

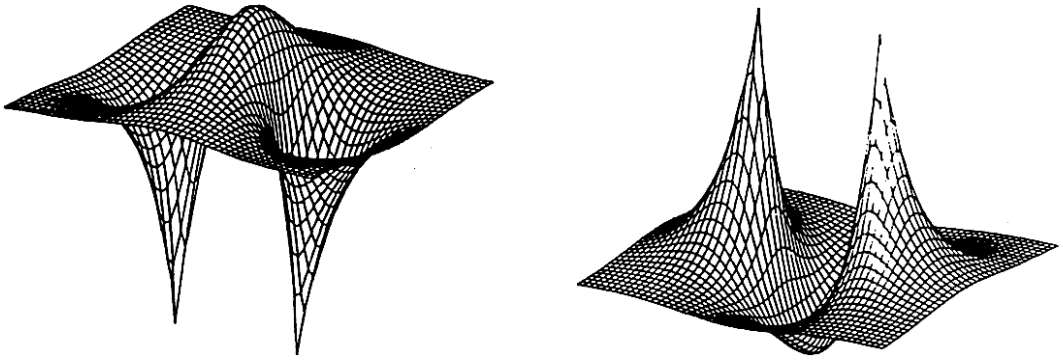


FIGURE 12-8
Differences in probability densities between (*a*) the bonding $\sigma_g 1s$ function and (*b*) the antibonding $\sigma_u 1s$ function of H_2^+ according to Eq. (12-34). The two upward-pointing peaks of (*b*) represent a buildup of probability density *outside* the internuclear region; the sag between these peaks represents a decrease in probability density between the nuclei. Note that this decrease and increase are relative to the density due to two noninteracting $1s^2$ atomic probability densities. The two downward-pointing peaks of (*a*) represent a decrease of probability density outside the internuclear region, and the mound between these indicates an increase of probability density between the nuclei.

from **Elementary Quantum Chemistry**, 2nd Edition
by F. L. Pilar, McGraw-Hill, New York, 1990, p.348-349.

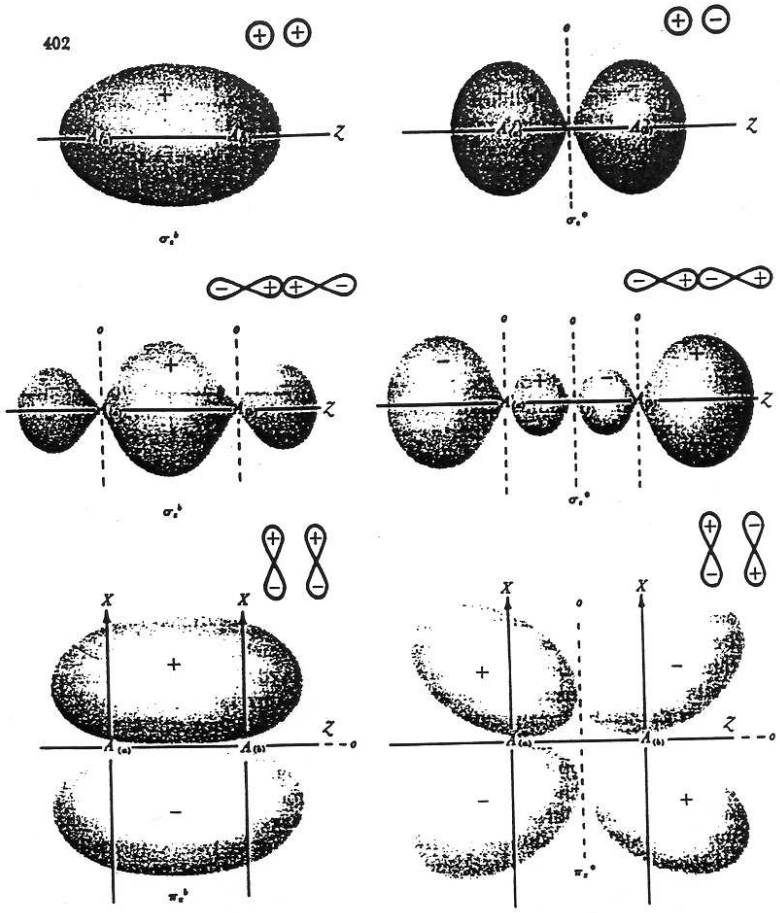
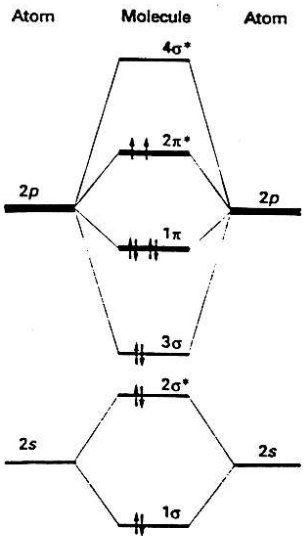
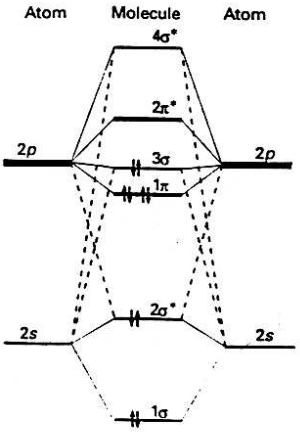


Figure 10–7. The six different kinds of molecular orbitals formed from the s, p_x, p_y, and p_z orbitals of two similar atoms in a diatomic molecule. The line drawn through the two nuclei is chosen as the Z axis. The symbol π indicates that, if the molecular orbital is rotated 180° *around the axis, the electron distribution is unchanged. The only effect is to reverse the signs of the parts of the wave function. Plus and minus signs represent only the signs on the wave function, and not electric charge. The atomic orbitals from which these are obtained are shown, with their appropriate signs, at the upper right of each molecular orbital. The atomic orbitals used are s (top row), p_z (middle row), and p_x (bottom row), which is equivalent to p_y. Bonding orbitals are in the left column; antibonding orbitals are in the right one. Dashed lines denoted by o are nodal planes of zero electron density.*

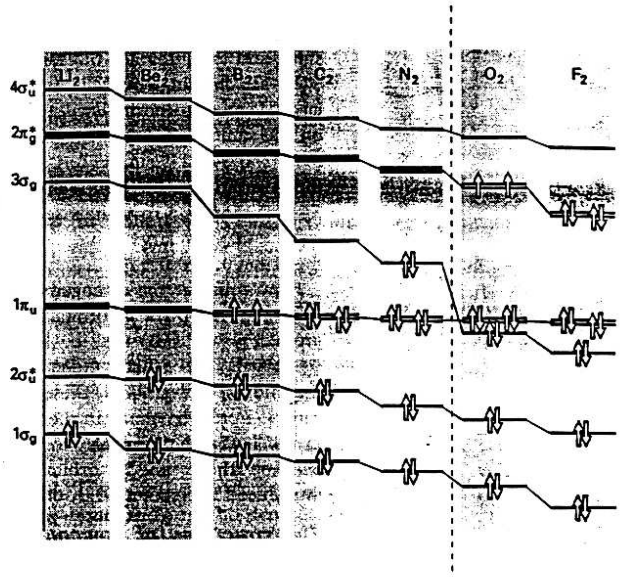
from **Chemical Principles**, 2nd Edition, *by R. E. Dickerson, H. B. Gray, and G. P. Haight, Jr,* W.A. Benjamin, Inc, Menlo Park, 1974, p.402.



14.26 The molecular orbital energy-level diagram for homonuclear diatomic molecules. As remarked in the text, this diagram should be used for O_2 (for which the electron configuration is shown) and F_2.



14.28 An alternative molecular orbital energy-level diagram for homonuclear diatomic molecules. As remarked in the text, this diagram should be used for diatomics as far as N_2. The electron configuration shown is that for N_2.



14.27 The variation of the orbital energies of Period-2 homonuclear diatomics.

from **Physical Chemistry,** 5th edition, by, P. Atkins, W. H. Freeman and Company, New York, 1994, p. 483.