e. Cl—H

electronegativity Cl = 3.16
electronegativity H = 2.20
difference 0.96

c, a, b, e, d

112. Consider the following and determine if they are polar. Explain your answers.

a. H_3O^+

polar, asymmetrical

b. PCl_5

nonpolar, symmetrical

c. H_2S

polar, asymmetrical

d. CF_4

nonpolar, symmetrical

113. Why is the CF_4 molecule nonpolar even though it contains polar bonds?

equal distribution of charge in a symmetrical molecule

114. Use Lewis structures to predict the molecular polarities for sulfur difluoride, sulfur tetrafluoride, and sulfur hexafluoride.

SF_2 and SF_4 are polar. SF_6 is nonpolar.

Mixed Review

Sharpen your problem solving skills by answering the following.

115. Consider the following molecules and determine which of the molecules are polar. Explain your answer.

a. CH_3Cl
b. ClF
c. NCl_3
d. BF_3
e. CS_2

The polar molecules are CH_3Cl, ClF, and NCl_3 because each molecule is asymmetric and the charge is not distributed evenly.

116. Arrange the following bonds in order of least to greatest polar character.

a. C—O

electronegativity O = 3.44
electronegativity C = 2.55
difference 0.89

b. Si—O

electronegativity O = 3.44
electronegativity Si = 1.90
difference 1.54

c. Ge—O

electronegativity O = 3.44
electronegativity Ge = 2.01
difference 1.43

d. C—Cl

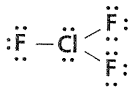
electronegativity Cl = 3.16
electronegativity CP = 2.55
difference 0.61

e. C—Br

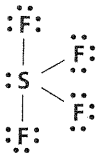
electronegativity Br = 2.96
electronegativity C = 2.55
difference 0.41

e, d, a, c, b

117. Draw the Lewis structure for ClF_3 and identify the hybrid orbitals.



118. Use the Lewis structure for SF_4, to predict the molecular shape and identify the hybrid orbitals.



sp^3d

119. Write the formula for each of these molecules.

a. chlorine monoxide

ClO