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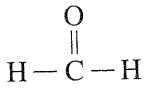
89. Locate the sigma and pi bonds in the following molecule.



single bonds: sigma bonds; double bond: one sigma bond and one pi bond

90. Locate the sigma and pi bonds in the following molecule.

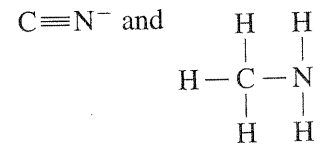
single bonds: sigma bonds; triple bond: one sigma and two pi bonds

Bond Length (9.1)

91. Consider the molecules CO, CO_2, and CH_2O. Which C—O bond is shorter? In which molecule is the C—O bond stronger?

It is shortest and strongest in the triple bond in CO.

92. Consider the carbon-nitrogen bonds in the following:



Which bond is shorter? Which is stronger?

The triple bond in $C\equiv N^-$ is shorter and stronger.

93. Rank each of the molecules below in order of the shortest to the longest sulfur-oxygen bond length.

a. SO_2
b. SO_3^{2-}
c. SO_4^{2-}

a, b, c

Naming Covalent Compounds (9.2)

94. Name each of the following solutions as an acid.

a. $HClO_2$

chlorous acid

b. H_3PO_4

phosphoric acid

c. H_2Se

hydroselenic acid

d. $HClO_3$

chloric acid

95. Name each of the following molecules.

a. NF_3

nitrogen trifluoride

b. NO

nitrogen monoxide

c. SO_3

sulfur trioxide

d. SiF_4

silicon tetrafluoride

96. Name each of the following molecules.

a. SeO_2

selenium dioxide

b. SeO_3

selenium trioxide

c. N_2F_4

dinitrogen tetrafluoride

d. S_4N_4

tetrasulfur tetranitride

Writing Formulas (9.2)

97. Write the formula for each of the following.

a. sulfur difluoride

SF_2

b. silicon tetrachloride

$SiCl_4$

c. carbon tetrafluoride

CF_4