**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 11/16/22**

**CH 111 Workshop 8 – Chapters 7 & 8**

1. Hydrogen gas, a potential future fuel, can be made by the reaction of methane gas and steam.

Use the following bond energies to calculate for this reaction. The bond energies of ,

, and are 414 kJ, 464 kJ, 436 kJ, and 799 kJ, respectively.

1. Explain why and are both nonpolar even though they contain polar bonds.

In both and , the pull of the external atoms on the central atom creates a symmetric distribution of electrons throughout the molecule.

1. Determine whether each of the following molecules is polar or nonpolar.

Nonpolar



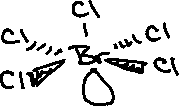
Polar



Polar



Polar



1. Determine the electron geometry, molecular geometry, bond angles, and hybridization on the central atom for each of the following molecules.

Tetrahedral

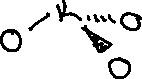
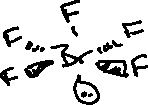
Tetrahedral

109.5

Tetrahedral

Tetrahedral

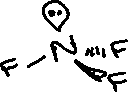
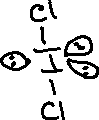
109.5



Tetrahedral

Trigonal Pyramidal

<109.5



Tetrahedral

Bent

<109.5



Octahedral

Square Pyramidal

<180,

Trigonal Bipyramidal

Linear

180

Trigonal Bipyramidal

Seesaw

<180, <120, <90



1. Answer the following about the nitrogen-oxygen bond in and .
   1. Which compound has the longer nitrogen oxygen bond?
   2. Which nitrogen-oxygen bond requires more energy to break?