**Quiz 7**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. What are four of the five classes of orbital geometries that are explored in the Molecular Model’s experiment (4 points)?

Linear, Trigonal planar, Tetrahedral, Trigonal bipyramidal, Octahedral

1. Define the following terms (8 points):

Delocalization : The phenomenon in which electrons in some molecules are not fixed to specific atoms or bonds but are spread out over several atoms or bonds. Delocalization is an energetically favorable process: by distributing charge over a greater volume, the net energy of the molecule is lowered, resulting in resonance stabilization.

**Resonance hybrid:** the average of the resonance forms shown by the individual Lewis structures.

**Formal charge:** is a partial charge on an atom in a molecule assigned by assuming that electrons in a chemical bond are shared equally between atoms, regardless of relative electronegativity

**Covalent bond:** is a form of chemical bonding that is characterized by the *sharing* of pairs of electrons between atoms, or between atoms and other covalent bonds. In short, attraction-to-repulsion stability that forms between atoms when they share electrons.

1. Use the bond energies provided to estimate ∆H°rxn for the reaction below (8 points):

Bond Bond Energy (kJ/mol)

Br-Br 193 2 Br2 (l) + C2H2 (g) 🡪 C2H2Br4 (l) ∆H°rxn = ?

C≡C 837

C=C 611

C-C 347

C-Br 276

C-H 414

Br-H 364

∆H°rxn = ∑ bond broken - ∑ bonds formed

∆H°rxn = [(2 mol)(Br-Br) + ~~(2 mol)(C-H)~~ + (1 mol)(C≡C)] – [~~(2 mol)(C-H)~~ + (4 mol)(C-Br) + (1 mol)(C-C)]

∆H°rxn = [(2 mol)(193 kJ/mol) + (1 mol)(837 kJ/mol)] – [(4 mol)(276 kJ/mol) + (1mol)(347 kJ/mol)]

∆H°rxn = -228 kJ