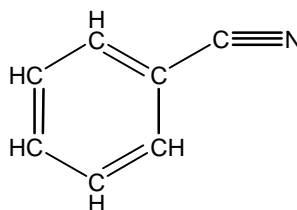
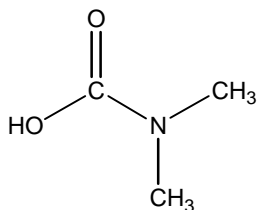
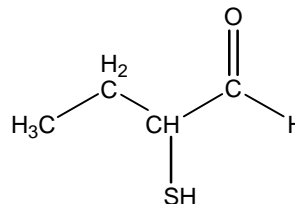
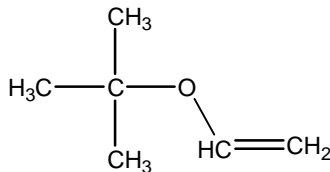
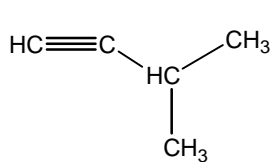
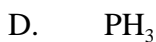
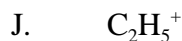
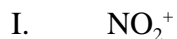
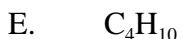


## Chem 233: Problem Set #1 (on Chapter 1)

1. What type of hybridization is used by each non-hydrogen atom in the substances shown below?

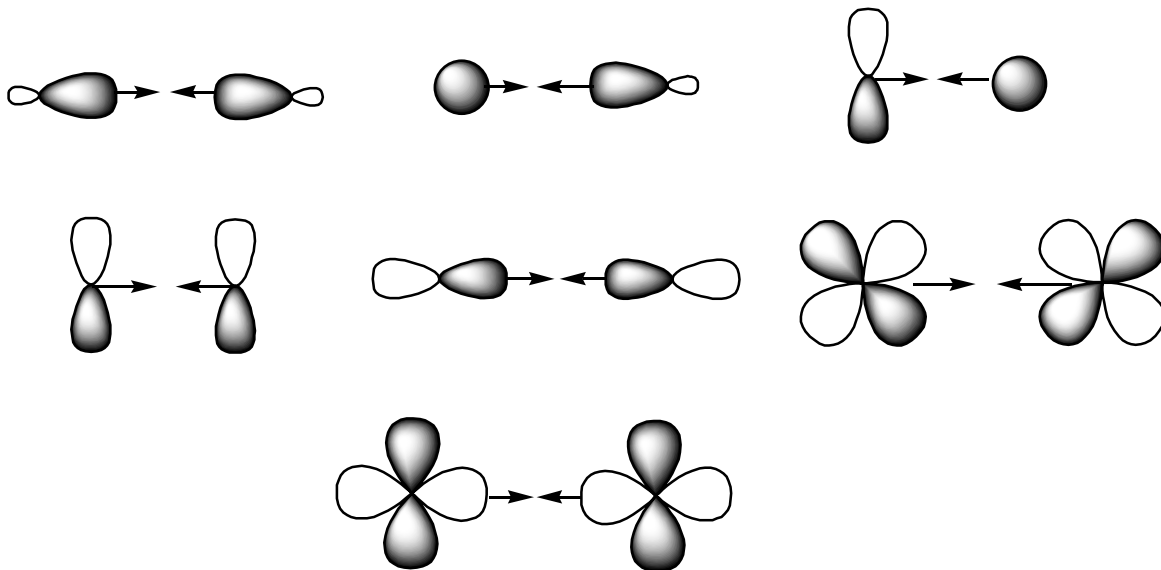


2. Draw Lewis (or Kekule) structures for all substances shown below. For those substances in E through H, draw all possible constitutional isomers.



3. Predict the molecular shape and bond angles for each substance given in question #2.
4. Draw a Lewis structure for  $\text{CH}_3\text{CN}$  and identify what type of hybridization each atom uses during bonding. Use valence bond theory and draw orbital pictures showing what orbitals are involved in the formation of the covalent bonds in  $\text{CH}_3\text{CN}$ .

5. Consider the singly occupied orbitals shown below. Decide whether each set of orbitals, when overlapped along the specified direction, will lead to formation of a  $\sigma$ -type bond, a  $\pi$ -type bond, or neither type bond



Note: At an appropriate time, answer keys to each problem set will be posted on the Chem 233 website ([www.chem.wvu.edu/chem15.Babb](http://www.chem.wvu.edu/chem15.Babb)). The problem sets will give you an idea of how questions will be asked on the exams. Work through each problem set before looking at the posted answer key. Problem sets are not all inclusive. Material that can be easily learned will not be included on the problem set but may still appear on the exam.