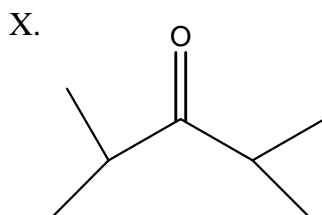
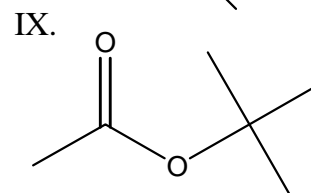
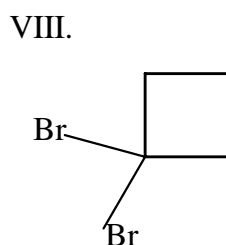
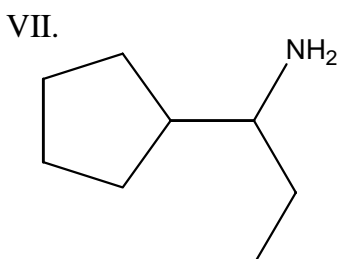
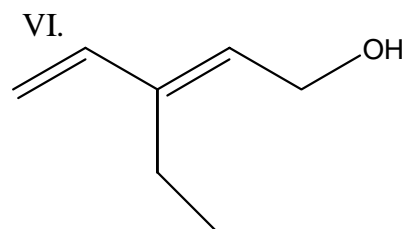
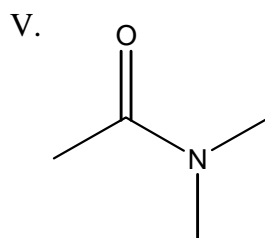
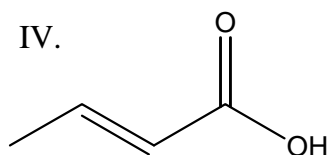
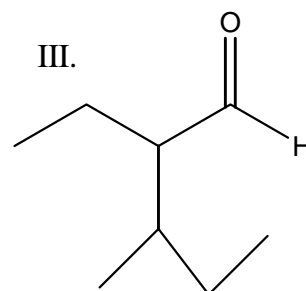
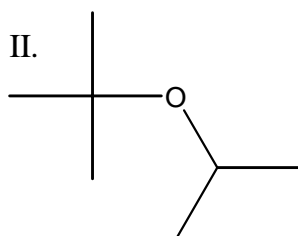
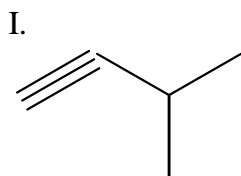


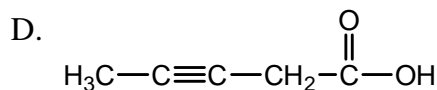
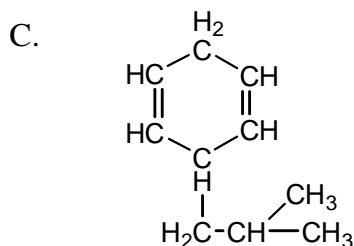
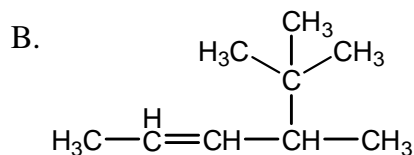
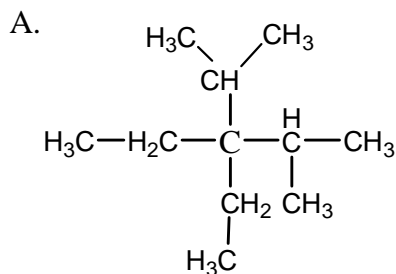
## Chem 231: Problem Set #1 (on Chapter 1)

1. For each of the following line structures:
- Write a structural formula which includes all hydrogen atoms (bonds to H can be left out).
  - Identify all functional groups present and label the molecular framework as acyclic, carbocyclic or heterocyclic.



2. Draw structural formulas for the five isomers of  $C_6H_{14}$ . Hint: Start with a six carbon straight chain, then with a five carbon branched chain and finally with a four carbon branched chain.

3. Draw the following structural formulas as line structures.



4. For an organic compound with the chemical formula  $\text{C}_3\text{H}_6\text{O}$ , there are many different structural isomers. Write a structural formula for  $\text{C}_3\text{H}_6\text{O}$  that designates a(n) .....

- A. acyclic ketone
- B. acyclic alcohol
- C. carbocyclic alcohol
- D. acyclic ether
- E. acyclic aldehyde
- F. heterocyclic ether (or epoxide)
- G. How many degrees of unsaturation in each of the structures written in A-F? Remember, a double bond has one degree of unsaturation; a triple bond, two; and each ring, one.

5. Draw two equivalent resonance structures for nitrite,  $\text{NO}_2^-$ . Calculate the formal charges on all atoms in each resonance structure. Show with curved arrows how one resonance structure can be converted to the other by movement of electron pairs.

Note: At an appropriate time, answer keys to each problem set will be posted on the Chem 231 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. Easier material that can be easily learned may not be included on the problem set but may still appear on the exam.