Name _____ Test 1

PHYS 0201 (Organic) Fall 2006

1. (6 pts each) Draw Lewis structures for the following molecules

a. CH_2CHCH_3

b. CCl_2H_2

c. $CH_3C(O)H$

d. CH_3CH_2SH

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

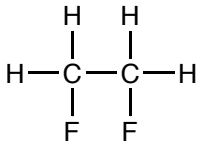
7. _____

8. _____

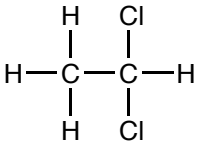
9. _____

2. (12 pts.) Determine whether the molecules are polar. (Kekulé structures are provided).

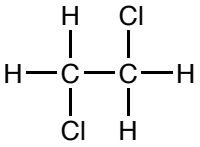
a.



b.



c.



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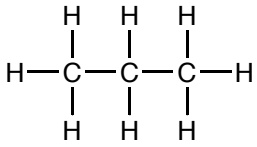
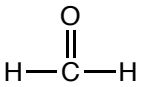
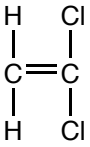


e.



f.



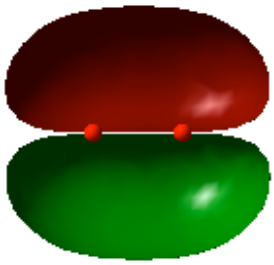
3. (8 pts.) Explain why is HF a weaker acid than HBr.

4. The following drawings are representations of four molecular orbitals for the molecule O_2. The two dots are the oxygen nuclei.

a. (8 pts.) Determine the symmetry of the following molecular orbitals (are they σ or π orbitals).

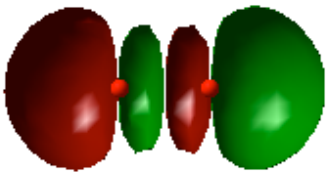
b. (8 pts.) Determine whether the orbital is bonding or antibonding.

i.



ii.

iii.



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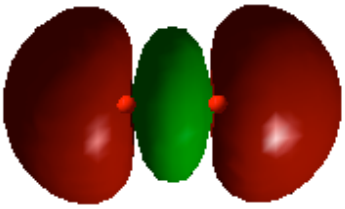
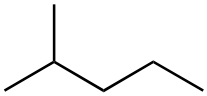


5. (12 pts.) Determine the formulae for the following structures.

a.



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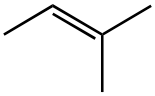
b.



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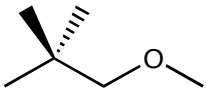
c.



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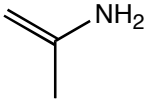
d.



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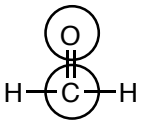
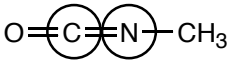
6. (2 pts. each) Determine the hybridization of the circled atoms in the following molecules.

a.



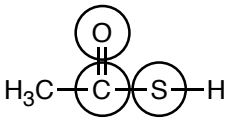
O _____ C _____

b.



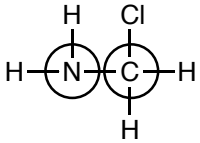
N _____ C _____

c.



O _____ C _____ S _____

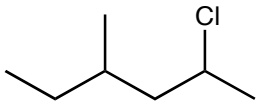
d.



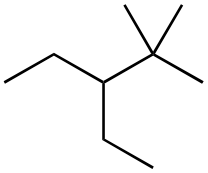
N _____ C _____

6. (10 pts.) Determine the IUPAC names for the following molecules.

a.



b.



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7. (12 pts.) Draw 3-dimensional structures for the following molecules. (Skeletal structures are acceptable).

a. 2,2-dimethyl-3-ethylheptane

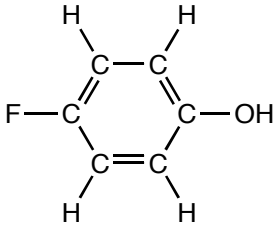
b. 1,1,1-trichloroethane

c. 2-bromo-1-propanol

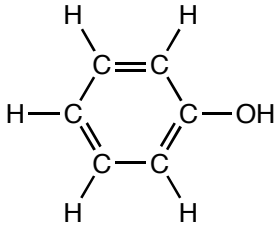
d. 1,2-diiodo-3-methylpentane

8. (10 pts.) For the following pairs of molecules, (a.) circle the acidic proton, and (b.) determine which is the stronger acid.

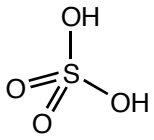
a.



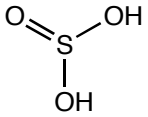
vs.



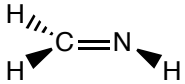
c.



vs.



9. a. (6 pts.) What orbitals are used to form the double bond in the following molecule.



b. (6 pts.) Draw a representation of the π bond.