**Exam 3 (from Fall 2011; this exam is a little shorter because I deleted things from Chapter 6 (alkynes) which we haven’t covered yet in Fall 2012). Your Exam 3 is all Chapter 13 and Chapter 5. Expect more IR/mass spec questions as indicated in our Chapter 13 review sheet that you already received, in addition to more enantiomer/diastereomer/meso compound questions.**

1. Determine the structure depicted by the Mass spec below. All work must be shown (your answer must be proved; calculation of formula, degrees of unsaturation, and the formation of the base peak must be shown).

Mass Spec: 83 amu (most intense line)

162 & 164 amu (50:50)

IR: 2900

(& bond consistent with the 162, 164 mass spec lines)

1. Determine the structure depicted by the Mass spec below. All work must be shown (your answer must be proved; calculation of formula, degrees of unsaturation, and the formation of the base peak must be shown).

Mass Spec: 15

31 (most intense line)

56

74

1. Perform homolytic cleavage on 2-methoxybutane. What structure would be the base peak and why?
2. Give the structure of a molecule that ONLY contains the following for each scenario:
3. IR: 3100, 2900, 2100, 1400-1600
4. IR: 2500-3600, 3100, 1700, 1680, 900
5. Use the following molecular formula (C2H2Cl2Br2) for each of the questions below:
6. Draw a Fischer structure that is Optically INACTIVE because it has NO chiral carbons.
7. Draw a Fischer structure that is Optically INACTIVE because it is a Meso Compound.
8. Draw a Fischer structure that is Optically ACTIVE.
9. Draw the Perspective structure for (2S, 3R) dichloropentane AND then draw a Diastereomer of the structure. (label chirality)
10. Draw the major organic product or products for the following reactions. Watch your stereochemistry! (**label chirality in any products if present); Circle your product or products!**
11. 1-methyl-1-cyclohexene + HCl
12. 1-pentene + HBr
13. oxymercuration-reduction of 1-methyl-1-cyclopentene
14. oxymercuration-reduction of (3R) 3-chloro-2-methyl-1-cyclopentene