

### Homework 6

Problems 1-5. Consider the NMR of ethanol  $\text{CH}_3\text{CH}_2\text{OH}$

1. The C-13 coupled spectrum will show a \_\_\_\_\_ for the  $\text{CH}_2$  (methylene) group.  
a) singlet      b) doublet      c) triplet      d) quartet      e) multiplet
2. In the proton spectrum from the highest chemical shift to the lowest, the integration of the peaks will be:  
a) 1, 2, 3      b) 1, 1, 1      c) 3, 2, 1      d) 0, 4, 3      e) 2, 3, 1
3. In the proton spectrum, the peaks from highest to lowest chemical shift will be:  
a) singlet, doublet, triplet      d) triplet, quartet doublet  
b) singlet, quartet, triplet      e) quartet, triplet singlet  
c) singlet, triplet, quartet
4. In the **coupled** carbon spectrum, the peaks from highest to lowest chemical shift will be:  
a) singlet, doublet, triplet      d) triplet, quartet, doublet  
b) singlet, singlet      e) quartet, triplet, singlet  
c) triplet, quartet
5. The normal (decoupled) carbon-13 spectrum will consist of \_\_\_\_\_ different peaks.  
a) 1      b) 2      c) 3      d) 6      e) more than 6
6. On a 60 MHz instrument, 0.50 ppm in the proton spectrum corresponds to \_\_\_\_\_ Hz. On the same instrument C-13 is run at a frequency of 15 MHz. On its spectrum, 0.50 ppm corresponds to \_\_\_\_\_ Hz.  
a) 60, 15      b) 15, 15      c) 7.5, 7.5      d) 7.5, 30      e) 30, 7.5