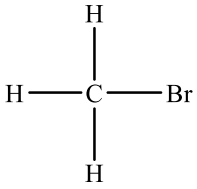
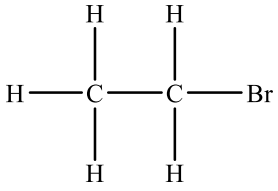
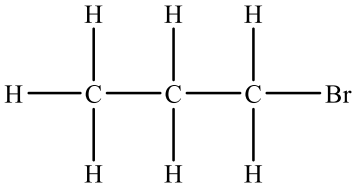
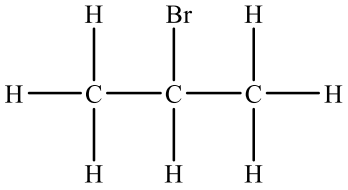
Homework 1 Key

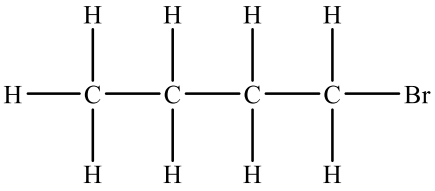
1) Draw out all of the bromoalkanes with one to four carbons: CH_3Br, C_2H_5Br, C_3H_7Br, and C_4H_9Br. (Hint: There are a total of 8 structures.)

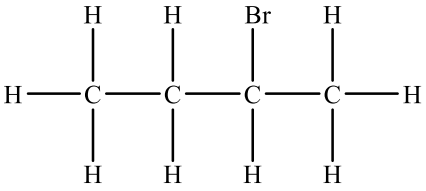
A 

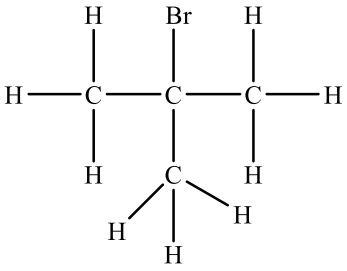
 B

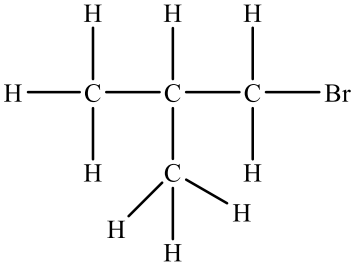
C 

 D

E 

 F

G 

 H

2) Which one of the C1 to C4 bromoalkanes will give one peak in the carbon (C-13) spectrum?
   A

3) Which three of the C1 to C4 bromoalkanes will give two peaks in the carbon spectrum? How do they differ?
   B (equal height)
   D (height ratio of 2:1)
   G (height ratio of 3:1)

4) Which two of the C1 to C4 bromoalkanes will give three peaks in the carbon spectrum? How do they differ?
   C (equal height)
   H (height ratio of 1:1:2)

5) Which two of the C1 to C4 bromoalkanes will give four peaks in the carbon spectrum? How do they differ?
E (equal height)
F (equal height)
Here the peak separation may be the only clue you have as to the identity of the molecule.

6) Sketch the C-13 NMR spectra you would expect for the isomers of C_3H_7Br.
(See the SDBS website.)

7) A compound with the molecular formula $C_3H_6Br_2$ has a C-13 NMR spectrum with 2 peaks. The peak with the higher chemical shift is twice the intensity of the lower chemical shift peak. What is the structure of the molecule?