CHEMISTRY 140A
QUIZ (CP 1-5)

H                                                  He
Li Be                                               B  C  N  O  F  Ne
Na Mg                                               Al Si P  S  Cl Ar
K  Ca Sc Ti V  Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y  Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I  Xe
Cs Ba La Hf Ta W  Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn

1a. Provide the best Lewis structure for compound I.

\[ \text{[NH}_3\text{CBrCHCH}_3\text{]}\text{Br} \]

I

1b. What is the hybridization for the nitrogen atom and the carbon atom bearing the bromine in I?

1c. Provide a clear three-dimensional (3-D) structure for I:

1d. Draw a constitutional isomer of I as a Lewis structure (show it in 3-D).

1e. Draw a Newman projection for the most stable conformational isomer of SiH₂MeCBr₂H, viewed down the silicon to carbon bond (the bold carbon).
2. For each of the following one-step transformations, use curved-arrow notation (electron pushing) to show the movement of electrons. Show all formal charges. **SKIP 2c.**

a)  
\[ \text{Me-CH(OH)CH(OH)Me} + \text{OH} \rightarrow \text{Me-CH(OH)CH(OH)Me} + \text{H}_2\text{O} \]

b)  
\[ \text{H}_2\text{O} + \text{Cl}_2\text{AlCl}_3 \rightarrow \text{H}_2\text{OAlCl}_3 \]

c)  
\[ \text{H}_2\text{C}=: \cdot \text{Br} \cdot + \text{CH}_3\text{CH}:= \rightarrow \text{H}_2\text{C}=: \cdot \text{Br} \cdot + \text{HBr} \]

d)  
\[ \text{N}=\text{C}:: + \text{HCH}_3\text{CH}_3 \rightarrow \text{N}=\text{C}:: \cdot \text{CH}_3\text{CH}_3 \]
3. Circle the functional groups found in the molecule shown below and name each of them.

\[ \text{\includegraphics[width=0.8\textwidth]{molecule.png}} \]

4. For each of the following energy values give description of what phenomena the value corresponds to.
   a) 2.9 kcal/mol
   b) 10.8 kcal/mol
   c) 0.6 kcal/mol
   d) 4.0 kcal/mol

5. Give the three most significant resonance forms for each of the following molecules. Each of your structures should be a Lewis structure:
   a) CH₃C(O)OH
   b) B(\text{Br}₃)
6. Draw structural representations of each of the following molecules:

i) (R)-3-bromo-3-methylhexane

ii) (S)-1,1,2-trimethylcyclopropane

7. For the structure shown below, use one of the templates to show the Newman projection which corresponds to the view down the bold bond. In the Newman projection you need only show the atoms attached directly to the carbons connected by the bold bond (and not the remainder of the ring). If there is a more stable conformation for the molecule, draw it in the box to the right (do not give a Newman projection for the more stable conformer). If there is none then write "none".

Do the same for the following molecules but provide your own Newman projection templates:
For the last compound in this problem assign the configuration of each stereocenter. How many stereoisomers are there for this compound?