CHEM 131 practice exam #1

1. Draw the line-bond formula for:

   \[
   \begin{aligned}
   &\text{H}_3\text{C} - \text{C} - \text{CH}_2\text{CH}_2\text{NH}_2 \\
   &\text{CH}_2\text{CH}_3
   \end{aligned}
   \]

2 Give the IUPAC name for following compounds

   \[
   \begin{aligned}
   &\text{Cl} - \text{CH}_2\text{CH}_3 \\
   &\text{F} - \text{Br} - \text{F} - \text{F} \\
   &\text{Br} - \text{CH}_2\text{(CH)}_3\text{CH}_3 \\
   &\text{Cl} - \text{CH}_2\text{CH}_3 \\
   &\text{CH}_2\text{CH}_3
   \end{aligned}
   \]
3. **Draw the structures** corresponding to the following names. **Note:** There is one name that cannot be drawn as it implies a structure that couldn’t exist—**circle this name.**

1-ethyl-4-methylcyclohexene

2,2-dibromo-1-Fluoro-1-heptene

6-Chloro-2,3,5-trimethyloctane

4 Draw the structure of an **alcohol** that has a molecular formula of C₄H₁₀O. **Be sure to depict all lone pair electrons**

5 Draw the structure of an **amine** that has a molecular formula of C₄H₉N. **Be sure to depict all lone pair electrons.**

6 Draw the structure of an **Ester** that has a molecular formula of C₅H₁₀O₂. **Be sure to depict all lone pair electrons.**
7 For the molecule below circle and name all the functional groups present. You do not have to circle the ‘alkane’ functional group.

8.(6 pts) Circle the compounds below that would not exist.

9.(8 pts) For the molecules below depict the polar covalent bonds by using δ + and δ - symbols to show charge separation.

The electronegativity values for some atoms: F = 4.0, Cl = 3.0, N = 3.0, C = 2.5, H = 2.1
Depict the **hydrogen bonding interaction** that would occur if methanol and ammonia were mixed together. Use $\delta^+$ and $\delta^-$ symbols to show charge separation.

\[
\text{CH}_3\text{OH} \quad \text{NH}_3
\]

methanol \hspace{1cm} ammonia

For compounds A-E below:

a) Rank in order of **boiling point** (lowest to highest).

b) Rank in order of **water solubility** (most soluble in water to least soluble in water)

Circle the compounds below that are considered **Aromatic**.
For the reactions below, draw the major organic product. If no reaction occurs put ‘NR’. Also state what type of reaction it is. Your choices are: addition, dehydration, or oxidation.

1. \( \text{CH}_2=\text{CH}_2 + \text{HBr} \)  
   Type of reaction: ________________________

2. \( \text{C}_5\text{H}_5\text{Cl} + \text{Br}_2 \)  
   Type of reaction: ________________________

3. \( \text{C}_6\text{H}_4\text{OH} + \text{H}^+ \)  
   Type of reaction: ________________________

4. \( \text{C}_6\text{H}_4\text{OH} + \text{H}_2 \)  
   Type of reaction: ________________________

5. \( \text{C}_6\text{H}_4\text{OH} + \text{KMnO}_4 \)  
   Type of reaction: ________________________

6. \( \text{C}_5\text{H}_5\text{Br} + \text{excess H}_2 \)  
   Type of reaction: ________________________
Determine if the following pairs are structural isomers, geometric isomers or just different conformations of each other.

a)

b)

c)