1. (2 pts.) Provide the functional group names for the groups indicated.

![Amine, Aromatic, Alcohol, Ether](image)

2. (1 pts.) What is the IUPAC name of the following compound?

![3,4-dimethylheptane](image)

3. (a) (1 pts.) How many H atoms are present in the molecule below? 36

![Molecule with cis標記](image)

(b) (0.5 pts.) How many cis-double bonds are present in this molecule? 1

(c) (0.5 pts.) How many trans-double bonds are present in this molecule? 4
4. (2 pts.) Which is more likely to be a liquid at room temperature: butane or decane? Explain.

Decane b/c this heavier alkane will have a higher bp than the lighter butane (which is a gas at RT) due to stronger dispersion forces.

5. (3 pts.) For each of the following, draw the structure of the major organic product that is produced. Also, indicate the new functional group that is formed in your product.

\[
\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_2-\text{CH}_3 + \text{H}_2\text{O} \xrightarrow{\text{H}^+} \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_2-\text{CH}_3
\]

\[
\text{OH} \leftarrow \text{OH} \text{ goes on more substituted C}
\]

\[
\text{CH}_2=\text{CH}=\text{CH}-\text{CH}_3 + 3 \text{H}_2 \xrightarrow{\text{Pt catalyst}} \text{alkane}
\]

6. (1 bonus point) For each of the following pairs of molecules, indicate if the structures represent (a) structural isomers, (b) cis-trans isomers, (c) the same molecule, or (d) none of these.

(i) 

(ii) 