[10 pts] 1. Consider the caffeine molecule, represented by the Kekule structure below.

\[
\begin{array}{c}
\text{N} \\
\text{O} \\
\text{H} \\
\text{O} \\
\text{N} \\
\text{N} \\
\end{array}
\]

Give the hybridization states of the following atoms:

atom 1 _____ atom 2 _____ atom 3 _____ atom 4 _____ atom 5 _____

State the geometry at each atom (not the arrangement of the electron pairs):

atom 1 __________ atom 2 __________ atom 3 __________ atom 4 __________ atom 5 ___________

[3 pts] 2. In the following alkane, how many total hydrogens are there of each of the following types?

\[
\begin{array}{c}
\text{CH}_3 \\
\text{CH}_2\text{CH}_3 \\
\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3 \\
\text{CH}_2\text{CH}_3 \\
\end{array}
\]

1° hydrogens _____ 2° hydrogens _____ 3° hydrogens _____

[5 pts] 3. There are five constitutional isomers having the formula C\textsubscript{6}H\textsubscript{14}.

Draw condensed structural formulas of these five molecules. You do not need to name them.

[2 pts] 4. Give the systematic (IUPAC) name of the compound below.

\[
\begin{array}{c}
\text{CH}_3 \\
\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3 \\
\text{CH}_3 \\
\end{array}
\]

______________________________