ORGANIC CHEMISTRY CH 351-04 (Wilson)
Exam #1 KEY
September 18, 2003

Question 1 _________  (24)
Question 3 _________  (20)
Question 4 _________  (20)
Question 5 _________  (21)
Question 6 _________  (15)
E. C. ___________ (3)

Average was 83.6%. High 100, low 44.
Both exams were the same with questions in a different order

Woman: "Chemistry's a wonderful thing."
Mae West: "I'll say it is, but I know a couple of druggists that never made a dime 'til Prohibition."

(Dialog from Night After Night)
1. Either name the following compounds using IUPAC nomenclature or draw each of the following compounds, whichever is appropriate. (6 pts each)

a. 1-isobutyl-1,4-dimethycyclononane

b. 7-ethyl-5-isopropyl-4-neopentyl-dodecane

c. bicyclo[5.3.1]undecane

d. 3-sec-butyl-1,1,4-tri-n-propylcyclopentane
2. Using the drawing below, answer the following questions.

a. Circle and name four different functional groups which are present. (3 pts each)

see above

b. How many sp² hybridized atoms are there? (4 pts).

six

c. How many sp hybridized atoms are there? (4 pts)

four

3. Use the following structure to answer the following questions:

a. Fill in all the missing electrons (include lone pairs if any) in this overall +1 molecule to give a GOOD Lewis structure. Be sure to indicate formal charge on individual atoms if any! (10 pts)

see all good answers next page
b. Draw another *reasonable* resonance form (it can be a Lewis structure which is not as good, but it still must be reasonable) of the structure below. Be sure to indicate formal charge if any! (10 pts)

\[
\begin{align*}
\text{CH}_3\text{C} & \equiv \text{N} \equiv \text{C} - \text{CH}_3 \\
\text{H}_3\text{C} & \equiv \text{N} \equiv \text{C} - \text{CH}_3 \\
\text{H}_3\text{C} & \equiv \text{N} \equiv \text{C} - \text{CH}_3
\end{align*}
\]

(21) 4. Given 3-ethyl-pentane, answer the questions below.

a. Show *all* the monochlorination products (7 pts).

\[
\begin{align*}
\text{CH}_2\text{CH}_3\text{CH}_2\text{CH} & \equiv \text{CH}_2\text{Cl} \\
\text{CH}_2\text{CH}_3\text{CH}_2\text{CH} & \equiv \text{Cl} \\
\text{CH}_2\text{CH}_3\text{CH}_2\text{CH} & \equiv \text{Cl}
\end{align*}
\]

b. Show *all* the monobromination products (7 pts).

\[
\begin{align*}
\text{CH}_2\text{CH}_3\text{CH}_2\text{CH} & \equiv \text{Br}
\end{align*}
\]

c. Draw any one of the monobromination products in a Newman projection sighting down the C\textsubscript{2}-C\textsubscript{3} bond (7 pts).

\[
\begin{align*}
\text{CH}_3\text{CH}_2 & \text{H} \quad \text{Br} \\
\text{CH}_3 & \text{H} \\
\text{CH}_2\text{CH}_3 & \text{H}
\end{align*}
\]

Other correct answers from different perspectives also accepted.
5. What is the relationship between the following pairs of compounds? Choose only three of the next four. You choices are: same compound; resonance structure; structural (or constitutional) isomer; or completely different compound. (5 pts each)

a. \( \text{CH}_2\text{CH}_3\text{OH} \) and \( \text{HO OH} \)
   Different compounds

b. \( \text{spiro}[4.2]\text{heptane} \) and \( \text{resonance structures} \)
   Same thing

c. \( \text{spiro}[4.2]\text{heptane} \) and \( \text{same thing} \)
   Same thing

d. \( \text{H} \text{CH}_3\text{H} \text{CH}_2\text{CH}_3 \) and 2,2-dimethylpentane
   Structural isomers

(3) BONUS: Name any one of Dr. Wilson’s office hours.
Any reasonable answer accepted.