Chemistry 140A
Whitesell
Winter Quarter, 2013
2nd Exam, Monday March 4

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Student ID Number

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Your answers to this exam are to be only your own work. You may use no written information during this test period other than the seven pages of this exam. You may not use the back of any pages for answers. You may submit your exam for regrading if and only if you have made NO marks on the exam except for a star (*) ON THIS PAGE next to the number(s) of the question(s) you would like regarded and your signature(s) and check(s) below. Exams must be turned in no later than 1 week exactly from the date of the notice on TED that they are available.

Signature (read the above before signing)

To request regrading, sign below and check the appropriate box(es).

Signature

I would like the questions marked with a star (*) regraded (check box at right)
If you feel that we have made an addition error in your score, check the box at the right
If you believe your grade was recorded incorrectly on TED, check the box at the right
1a. First order reactions do not occur with the following class of substituents (check all that apply, no partial credit):

- methyl
- secondary
- primary
- tertiary

b. Second order reactions do not occur with the following class of substituents (check all that apply, no partial credit):

- methyl
- secondary
- primary
- tertiary

c. Dimethyl sulfoxide is an example of a:

- polar protic solvent
- nonpolar protic solvent
- polar aprotic solvent
- nonpolar aprotic solvent

d. Water is an example of a:

- polar protic solvent
- nonpolar protic solvent
- polar aprotic solvent
- nonpolar aprotic solvent

d. The electronegativity of N is:

- 2.5
- 3.5
- 3.0
- 2.2

f. The electronegativity of H is:

- 2.5
- 3.5
- 3.0
- 2.2

g. The electronegativity of O is:

- 2.5
- 3.5
- 3.0
- 2.2
2. Show the mechanism for the following reaction. Your mechanism must include curved arrows showing the flow of electrons for all bonds made and broken. Answers outside the provided box will not receive credit.

3. Using the chair provided, indicate the conformation required for bromocyclohexane to undergo an E2 reaction to form cyclohexene. Show the hydrogen that is lost (but no others).
4. Provide the expected major organic product from each of the reactions below. In the box below the arrow, indicate the type of reaction (E1, etc.).

\[
\begin{align*}
\text{CH}_3\text{CHCl} & \xrightarrow{\text{KOT-Bu}} \text{CH}_2\text{CH} & \text{E2} \\
\text{CH}_3\text{Br} & \xrightarrow{\text{KOT-Bu DMSO}} \text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH} & \text{E2} \\
\text{CH}_3\text{CHCl} & \xrightarrow{\text{SH}} \text{CH}_2\text{CH}_2\text{SH} & \text{S_N2} \\
\text{CH}_3\text{Br} & \xrightarrow{\text{H}_2\text{O}} \text{CH}_3\text{CH}_2\text{OH} & \text{S_N1} \\
\text{CH}_3\text{OH} & \xrightarrow{\text{H}_2\text{SO}_4 - \text{H}_2\text{O}} \text{CH}_3 & \text{E1}
\end{align*}
\]

5. Indicate the number of unique (i.e. different) alkenes that would result from an E2 reaction of the following alkyl bromides. Place your answer in the box provided.

\[
\begin{align*}
\text{1} \\
\text{2} \quad \text{2} \\
\text{1} \quad \text{3} \quad \text{2}
\end{align*}
\]

Your signature (in ink) ____________________________
6. Draw a clear representation of the transition state for the reaction of hydroxide ion with methyl bromide. You must place your answer in the box provided.

7. Indicate the stereochemistry ($R$, $S$) for each center of chirality in the following molecules by placing the appropriate symbol in one of the circles and drawing an arrow to the center (there are extra circles). Do not guess---wrong answers will cancel correct ones.
8. Using the provided templates, draw representations the two chair conformations for cis-1,2, 1,3, and 1,4-dimethylecyclohexane. Indicated which is more stable or state that they are the same energy, which ever is appropriate.